Natural Resources Conservation Service (NRCS)

County Covered	Title	Published Date	Current Version Online
Santa Cruz	Nogales Area	1930	
Santa Cruz, Cochise	Santa Cruz County and Parts of Cochise and Pima Counties	1979	yes

NOTE: The Soil Conservation Service soils reports are included in this list, in addition to the more recent NRCS reports.

US Forest Service

National Forest	Title	Published Date	Current Version Online
Apache-Sitgreaves NF	Terrestrial Ecosystems Survey of Apache-Sitgreaves NF; USDA Southwest Region	1989	no
	Maps at 1:24,000 scale		
Coconino NF	Terrestrial Ecosystems Survey of Coconino NF; USDA Southwest Region	1995	no
	Maps at 1:24,000 scale		
Tonto NF	Terrestrial Ecosystems Survey of Tonto NF; USDA Southwest Region	1985	no
	Maps at 1:18,000 scale		
	Report 1 — North third of the forest		
	Report 2 — Northeast part of the Globe Ranger District		
Coronado NF	General Ecosystems Survey of Coronado NF; USDA Southwest Region	1991	no
	Maps at 1:250,000 scale		

2.2.3 Natural Infrastructure

Biotic communities occur within all three focus areas, except where specifically noted. Distribution data for individual species may change, and habitat ranges vary as a result of species movement or surveys of new areas. However, this study only identifies the major ranges of individual species by county, because surveys were not conducted for this study.

Biotic Communities

The study area supports incredibly diverse flora and fauna across many elevations and different biotic communities. Within the study area, there are 11 different biotic communities ranging from desertscrub communities to chaparral, woodlands, and grasslands.

The Arizona Upland division of Sonoran desertscrub covers approximately 6.8 percent of the study area. This biotic community is characterized by leguminous trees such as foothills paloverde (*Parkinsonia microphylla*), ironwood (*Olneya tesota*), and mesquites (*Prosopis* spp.). Cacti are abundant and include the saguaro cactus (*Carnegia gigantea*), cholla (*Cylindropuntia* spp.), barrel cactus (*Ferocactus* spp.), and pincushion cactus (*Mammillaria* spp.). Annual precipitation generally ranges between 12 and 17 inches, with summer rainfall accounting for 30 to 60 percent of the annual total. Elevations range from approximately 980 to above 3,280 feet (Brown 1994).

In the southeastern portion of Arizona, near the state's borders with New Mexico and Sonora, Mexico, is dominated by Chihuahuan desertscrub, which covers approximately 6.9 percent of the study area within the Copper Country and Cochise-Santa Cruz Focus areas. Dominant vegetation in outwash plains, low valleys, and hills is characterized by large woody shrubs such as creosotebush (*Larrea tridentata*), tarbush (*Flourensia cernua*), honey mesquite (*Prosopis glandulosa*), and whitethorn acacia (*Acacia constricta*). Upslope areas are dominated by mixed succulent-scrub communities consisting of succulents (*Yucca, Agave,* and *Dasylirion* spp.) and woody shrubs such as ocotillo (*Fouqueria splendens* and *Leucophyllum* spp.). Annual precipitation ranges from 8 to 14 inches, usually with greater than 65 percent falling as summer rain. The Chihuahuan Desert is a high desert with elevations ranging from 1,300 to 5,000 feet. The climate is distinctly temperate with freezing nighttime temperatures typically expected between October and March (Brown 1994).

Great Basin conifer woodland covers approximately 17.6 percent of the study area and is characterized by juniper (*Juniperus* spp.) and piñon pine (*Pinus* spp.) with subdominant shrubs including oaks (*Quercus* spp.), sagebrush (*Artemisia tridentata*), and antelope bitterbrush (*Purshia tridentata*). A herbaceous layer consisting of many different grasses (e.g., *Bouteloua gracilis*) and forbs (*Eriogonum* spp., *Penstemon* spp.) is found between the woody dominants and subdominants on mesas, plateaus, slopes, and ridges between 4,900 to 7,000 feet in elevation. Precipitation ranges from 10 to 20 inches annually, with summer rains contributing much of the precipitation in the eastern portions of the biotic community, while in the western portions greater than 80 percent comes during the late fall and winter. Winter minimum temperatures are below freezing for more than 150 days a year. Great Basin conifer woodland intergrades with montane conifer forests at the higher elevations and with Great Basin desertscrub and interior chaparral at the lower extremes (Brown 1994).

Great Basin desertscrub covers approximately 0.9 percent of the study area within the Mogollon Rim Focus Areas and is characterized by low-diversity scrublands of sagebrush and shadscale (*Atriplex confertifolia*), with few cacti or perennial grasses. Floodplains of larger waterways are dominated by greasewood (*Sarcobatus vermiculatus*) and fourwing saltbush (*Atriplex canescens*), as well as the introduced Russian olive (*Elaeagnus angustifolia*) and saltcedar (*Tamarix* spp.). Elevations in Great Basin desertscrub range from 3,900 to 7,200 feet. Annual precipitation averages from 6 inches in the western portions to nearly 12 inches at the higher elevations and in the eastern portions. Precipitation shows a strong, winter-dominated pattern in the west, with a gradual shift eastward toward a more even distribution between summer and winter precipitation (Brown 1994).

Interior chaparral is found at midelevations (3,000 to 5,600 feet) on foothills, mountain slopes, and canyon habitats in central sub-Mogollon regions within the Mogollon Rim and Copper Country Focus areas. This biotic community covers approximately 4.1 percent of the study area. Vegetation within interior chaparral is characterized by 60 to 70 percent cover of shrubs with dense compact crowns and small evergreen leaves such as scrub oaks (*Quercus turbinella*, and many other *Quercus* species), pointleaf and pringle manzanita (*Arctostaphylos pungens, A. pringlei*), and catclaw acacia (*Acacia greggii*). Precipitation varies from 15 to 25 inches annually and falls in a distinctly bimodal pattern, characterized by spring drought between April and June, which is the driest time of the year (Brown 1994).

Madrean evergreen woodland occurs in the northernmost extent of the mountains of southeastern Arizona up to the sub-Mogollon regions of Yavapai County between the elevations of 3,400 and 6,500 feet, depending on landscape position and soil depth.

Madrean evergreen woodland covers approximately 8.9 percent of the study area. Evergreen oaks, junipers (*Juniperus* spp.), piñon pine, and madroños (*Arbutus arizonica, A. texanus*) characterize this woodland. The lower-elevation Madrean evergreen woodlands intergrade into semidesert grasslands in southeastern Arizona, and interior chaparral in the central mountains. The major understory vegetation is made up of grasses (e.g., *Muhlenbergia* spp.) with many cacti and leaf succulents (*Yucca* spp., *Agave* spp., *Nolina microcarpa*). Precipitation ranges from 18 to 25 inches annually, with approximately half occurring as summer rainfall (Brown 1994).

Rocky Mountain (Petran) montane conifer forest covers approximately 16 percent of the study area at elevations from 5,600 to over 8,000 feet on mountains, mesas, and plateaus. Large evergreen conifers and winter deciduous trees characterize these open forests, with openings dominated by grasses and forbs. The dominant tree at lower elevations is ponderosa pine (*Pinus ponderosa*). At higher elevations and in canyons and on north slopes, a cooler, mixed-conifer forest occurs with Douglas fir (*Pseudotsuga menziesii*), white fir (*Abies concolor*), and quaking aspen (*Populus tremuloides*). Precipitation varies from 18 to almost 28 inches annually, with over half occurring during the summer months (Brown 1994).

Rocky Mountain (Petran) subalpine conifer forest covers approximately 0.5 percent of the study area at elevations from 6,900 feet to timberline at approximately 10,700 feet in the White Mountains in Apache County, bisected by the Mogollon Rim and Copper Country Focus areas. The dominant vegetation consists of coniferous trees such as subalpine fir (*Abies lasiocarpa*) and Engelmann spruce (*Picea engelmanii*), with wetter sites occupied by deciduous trees such as willows (*Salix* spp.) and thin-leaf alder (*Alnus tenuifolia*), and exposed windy sites occupied by limber and bristlecone pine (*Pinus flexilis, P. aristata*). Aspen are common in areas previously disturbed by fire or logging. At the lower elevations, this forest type intergrades with Rocky Mountain montane conifer forest. These forests are wet and cold, with the growing season lasting less than 75 days and average precipitation ranging from 25 inches to over 40 inches annually (Brown 1994).

Plains and Great Basin grassland occur on generally open and exposed plains north of the Mogollon region in Navajo and Apache counties, from 4,200 to 6,200 feet in elevation and covering approximately 14.9 percent of the study area. Grasslands are separated into three major divisions: tall-, mixed-, and short-grass communities. Composition of dominant grasses and forbs within these communities varies considerably depending on available soil moisture, which is influenced by average temperature, precipitation, and soil texture. Precipitation ranges between 12 and 18 inches annually. Characteristics of modern grasslands have been modified by extensive overgrazing and lack of natural fire regimes, leading to invasion by woody shrubs (Brown 1994).

Semidesert grasslands cover approximately 23.1 percent of the study area and are characterized by vegetation dominated by perennial grasses and woody shrubs, positioned on the landscape between Chihuahuan desertscrub below, and either interior chaparral or evergreen woodland above. Elevations range from 3,100 to 5,400 feet. Dominant grasses include tobosa (*Pleuraphis mutica*) and black grama (*Bouteloua eriopoda*) and occur with many different species characteristic of Chihuahuan desertscrub, such as agave and yucca, cacti, and woody shrubs such as mesquite (*Prosopis glandulosa*) and creosotebush. Winters are mild with generally less than 100 days per year with freezing temperatures. Precipitation averages between 10 to 16 inches annually, 35 to 65 percent of which falls between April and August (Brown 1994).

Subalpine grasslands occur in Arizona between 7,000 to 9,800 feet on flat or undulating terrain in valleys, and on slopes and ridges adjacent to Rocky Mountain montane conifer forests in the White Mountains in Apache County bisected by the Mogollon Rim and Copper Country Focus areas. This biotic community covers approximately 0.3 percent of the study area. Dominant vegetation in subalpine grasslands is herbaceous, consisting almost entirely of perennial bunch grasses (e.g., *Festuca, Poa, Stipa*) and forbs (*Trifolium, Erigeron*). Precipitation averages 22 to 24 inches annually, a significant amount of which is received as snowfall. Due to the high elevations, the growing season is usually less than 100 days (Brown 1994).

Table 2-8 – Biotic Communities

Formation	Biotic Community	Brief Description	Percent of Study Area Land
Tropical-subtropical desertlands	Arizona Upland Sonoran desertscrub	Characterized by leguminous trees, cacti such as the Saguaro cactus (*Carnegia gigantea*) and chollas (*Cylindropuntia* spp.). Annual precipitation generally ranges between 12 and 17 inches with summer rainfall accounting for 30 to 60 percent of the annual total. Elevations range from approximately 980 to above 3,280 feet.	6.8
Warm-temperate desertlands	Chihuahuan desertscrub	Dominant vegetation is characterized by large woody shrubs such as creosotebush (*Larrea tridentata*) and mixed succulent-scrub communities. Annual precipitation ranges from 8 to 14 inches, with usually greater than 65 percent falling as summer rain. Elevations range from 1,300 to 5,000 feet and the climate is temperate with freezing nighttime temperatures typically expected between October and March.	6.9
Warm-temperate forests and woodlands	Great Basin conifer woodland	Evergreen woodland characterized by openly spaced junipers (*Juniperus* spp.) and Piñon pine (*Pinus* spp.). Elevations range between 4,900 to 7,000 feet, and annual precipitation ranges from 10 to 20 inches. Winter minimum temperatures are below freezing for more than 150 days a year.	17.6
Cold-temperate desertlands	Great basin desertscrub	Low-diversity scrublands characterized by sagebrush (*Artemisia tridentata*) and shadscale (*Atriplex confertifolia*), with few cacti or perennial grasses. Elevations range from 3,900 up to 7,200 feet. Annual precipitation averages from 6 inches on the western portions to nearly 12 inches at the higher elevations and in the eastern portions. Precipitation shows a strong, winter-dominated pattern in the west, with a gradual shift eastward toward a more even distribution between summer and winter precipitation.	0.9

Formation	Biotic Community	Brief Description	Percent of Study Area Land
Cold-temperate scrublands	Interior chaparral	Occupies midelevations (3,000 to 5,600 feet) in central sub-Mogollon regions as well as in drier mountain ranges of southeastern Arizona. Vegetation is characterized by 60 to 70 percent cover of shrubs such as shrub oaks (*Quercus turbinella*, and many other spp.), and manzanita (*Arctostaphylos* spp.). Annual precipitation varies from 15 to 25 inches and falls in a distinctly bimodal pattern, characterized by spring drought between April and June, which is the driest time of the year.	4.1
Warm-temperate forests and woodlands	Madrean evergreen woodland	Occurs in the northernmost extent of the mountains of southeastern Arizona up to the sub-Mogollon regions between the elevations of 3,400 and 6,500 feet. This woodland is characterized by evergreen oaks, junipers (*Juniperus* spp.), piñon pine, and madroños (*Arbutus arizonica, A. texanus*). The major understory vegetation is grasses (e.g., *Muhlenbergia* spp.) with many cacti and leaf succulents (*Yucca* spp., *Agave* spp., *Nolina microcarpa*). Precipitation ranges from 18 to 25 inches annually, with approximately half coming as summer rainfall.	8.9
Cold-temperate forests and woodlands	Rocky Mountain (Petran) montane conifer forest	Elevation ranges from 5,600 to over 8,000 feet on mountains, mesas, and plateaus. These open forests are characterized by large evergreen conifers and winter deciduous trees with openings dominated by grasses and forbs. The dominant tree at lower elevations is ponderosa pine (*Pinus ponderosa*). At higher elevations and in canyons and on north slopes, a cooler, mixed-conifer forest occurs with Douglas fir (*Pseudotsuga menziesii*), white fir (*Abies concolor*), and quaking aspen (*Populus tremuloides*). Annual precipitation varies from 18 to almost 28 inches, with over half coming during the summer months.	16.0
Boreal forests and woodlands	Rocky Mountain (Petran) subalpine conifer forest	Occurs from 6,900 feet to timberline at approximately 10,700 feet in elevation. The dominant vegetation consists of coniferous trees subalpine fir (*Abies lasiocarpa*) and Engelmann spruce (*Picea engelmanii*). These forests are wet and cold, with the growing season lasting less than 75 days and average annual precipitation ranging between 25 to over 40 inches.	0.5
Cold-temperate grasslands	Plains and great basin grassland	Occurs on generally open and exposed plains north of the Mogollon region in Navajo and Apache counties, from 4,200 feet up to 6,200 feet. Composition of dominant grasses and forbs within these communities varies considerably depending on available soil moisture, which is influenced by average temperature, precipitation, and soil texture. Annual precipitation ranges between 12 and 18 inches.	14.9

Formation	Biotic Community	Brief Description	Percent of Study Area Land
Warm-temperate grasslands	Semidesert grassland	Characterized by vegetation dominated by perennial grasses and woody shrubs, positioned on the landscape between Chihuahuan desertscrub below, and either interior chaparral or evergreen woodland above. Elevations range from 3,100 to 5,400 feet. Winters are mild with generally less than 100 days per year with freezing temperatures. Precipitation averages between 10 to 16 inches per year, 35 to 65 percent of which falls between April and August.	23.1
Artic-boreal grasslands	Subalpine grassland	In Arizona, these grasslands occur between 7,000 and 9,800 feet in the White Mountains in Apache County. Dominant vegetation is herbaceous, consisting almost entirely of perennial bunch grasses (e.g., *Fustuca, Poa, Stipa*) and forbs (*Trifolium, Erigeron*). Precipitation averages 22 to 24 inches per year, of which a significant amount is received as snowfall.	0.3

SOURCE: Brown 1994

Wildlife

Wildlife in the region represents a diverse mix of species from different biotic communities. The region includes many endemic, isolated populations of species that are only found in specific mountain ranges or basins within the study area. Much of the study area contains isolated populations of wildlife species that are sensitive to human disturbance and environmental change in the region. Special status species listed with state or Federal protection appear in Table 2-9.

In the Sky Island ecoregion found in the southern part of the study area, grassland species typically are at the terminus of their respective continental ranges. Semidesert grassland species that originate in Mexico, and Great Plains grassland species that are centered in the central United States, reach distribution limits within this ecoregion. Less predominant are species of the Sonoran desertscrub Arizona Uplands subdivision biotic community that reach their easternmost distribution in this region. Mountain ranges in the Sky Islands ecoregion typically have a complement of species that are typical of the Sierra Madre occidental mountain range in Mexico, but in southeastern Arizona these populations represent isolated remnant faunas of the late Pleistocene that were previously widespread in the ecoregion (Bailey 1995). The two largest mountain ranges with these relict populations include the Chiracahua Mountains and Pinaleño Mountains. Widespread desert species and species with continental distributions complement the wildlife in both lowland desert and upland montane habitats.

The Apache Highlands that border the Sky Island ecoregion to the north include wildlife species characteristic of a wide variety of habitats and biotic communities. This ecoregion runs east-west through the central part of the study area. The western part of the ecoregion contains parts of the Sonoran desertscrub Arizona Uplands subdivision fauna (Bailey 1995). The Apache Highlands are dominated by wildlife species that are characteristic of the Sierra Madre occidental or southern Rocky Mountains. These species typically occur in woodlands, mixed-conifer forests, or spruce fir forests in the higher elevations of the region. Rounding out the complement of species are widespread continental and desert species.

Formation	Biotic Community	Brief Description	Percent of Study Area Land
Cold-temperate scrublands	Interior chaparral	Occupies midelevations (3,000 to 5,600 feet) in central sub-Mogollon regions as well as in drier mountain ranges of southeastern Arizona. Vegetation is characterized by 60 to 70 percent cover of shrubs such as shrub oaks (*Quercus turbinella*, and many other spp.), and manzanita (*Arctostaphylos* spp.). Annual precipitation varies from 15 to 25 inches and falls in a distinctly bimodal pattern, characterized by spring drought between April and June, which is the driest time of the year.	4.1
Warm-temperate forests and woodlands	Madrean evergreen woodland	Occurs in the northernmost extent of the mountains of southeastern Arizona up to the sub-Mogollon regions between the elevations of 3,400 and 6,500 feet. This woodland is characterized by evergreen oaks, junipers (*Juniperus* spp.), piñon pine, and madroños (*Arbutus arizonica, A. texanus*). The major understory vegetation is grasses (e.g., *Muhlenbergia* spp.) with many cacti and leaf succulents (*Yucca* spp., *Agave* spp., *Nolina microcarpa*). Precipitation ranges from 18 to 25 inches annually, with approximately half coming as summer rainfall.	8.9
Cold-temperate forests and woodlands	Rocky Mountain (Petran) montane conifer forest	Elevation ranges from 5,600 to over 8,000 feet on mountains, mesas, and plateaus. These open forests are characterized by large evergreen conifers and winter deciduous trees with openings dominated by grasses and forbs. The dominant tree at lower elevations is ponderosa pine (*Pinus ponderosa*). At higher elevations and in canyons and on north slopes, a cooler, mixed-conifer forest occurs with Douglas fir (*Pseudotsuga menziesii*), white fir (*Abies concolor*), and quaking aspen (*Populus tremuloides*). Annual precipitation varies from 18 to almost 28 inches, with over half coming during the summer months.	16.0
Boreal forests and woodlands	Rocky Mountain (Petran) subalpine conifer forest	Occurs from 6,900 feet to timberline at approximately 10,700 feet in elevation. The dominant vegetation consists of coniferous trees subalpine fir (*Abies lasiocarpa*) and Engelmann spruce (*Picea engelmanii*). These forests are wet and cold, with the growing season lasting less than 75 days and average annual precipitation ranging between 25 to over 40 inches.	0.5
Cold-temperate grasslands	Plains and great basin grassland	Occurs on generally open and exposed plains north of the Mogollon region in Navajo and Apache counties, from 4,200 feet up to 6,200 feet. Composition of dominant grasses and forbs within these communities varies considerably depending on available soil moisture, which is influenced by average temperature, precipitation, and soil texture. Annual precipitation ranges between 12 and 18 inches.	14.9

Formation	Biotic Community	Brief Description	Percent of Study Area Land
Warm-temperate grasslands	Semidesert grassland	Characterized by vegetation dominated by perennial grasses and woody shrubs, positioned on the landscape between Chihuahuan desertscrub below, and either interior chaparral or evergreen woodland above. Elevations range from 3,100 to 5,400 feet. Winters are mild with generally less than 100 days per year with freezing temperatures. Precipitation averages between 10 to 16 inches per year, 35 to 65 percent of which falls between April and August.	23.1
Artic-boreal grasslands	Subalpine grassland	In Arizona, these grasslands occur between 7,000 and 9,800 feet in the White Mountains in Apache County. Dominant vegetation is herbaceous, consisting almost entirely of perennial bunch grasses (e.g., *Fustuca, Poa, Stipa*) and forbs (*Trifolium, Erigeron*). Precipitation averages 22 to 24 inches per year, of which a significant amount is received as snowfall.	0.3

SOURCE: Brown 1994

Wildlife

Wildlife in the region represents a diverse mix of species from different biotic communities. The region includes many endemic, isolated populations of species that are only found in specific mountain ranges or basins within the study area. Much of the study area contains isolated populations of wildlife species that are sensitive to human disturbance and environmental change in the region. Special status species listed with state or Federal protection appear in Table 2-9.

In the Sky Island ecoregion found in the southern part of the study area, grassland species typically are at the terminus of their respective continental ranges. Semidesert grassland species that originate in Mexico, and Great Plains grassland species that are centered in the central United States, reach distribution limits within this ecoregion. Less predominant are species of the Sonoran desertscrub Arizona Uplands subdivision biotic community that reach their easternmost distribution in this region. Mountain ranges in the Sky Islands ecoregion typically have a complement of species that are typical of the Sierra Madre occidental mountain range in Mexico, but in southeastern Arizona these populations represent isolated remnant faunas of the late Pleistocene that were previously widespread in the ecoregion (Bailey 1995). The two largest mountain ranges with these relict populations include the Chiracahua Mountains and Pinaleño Mountains. Widespread desert species and species with continental distributions complement the wildlife in both lowland desert and upland montane habitats.

The Apache Highlands that border the Sky Island ecoregion to the north include wildlife species characteristic of a wide variety of habitats and biotic communities. This ecoregion runs east-west through the central part of the study area. The western part of the ecoregion contains parts of the Sonoran desertscrub Arizona Uplands subdivision fauna (Bailey 1995). The Apache Highlands are dominated by wildlife species that are characteristic of the Sierra Madre occidental or southern Rocky Mountains. These species typically occur in woodlands, mixed-conifer forests, or spruce fir forests in the higher elevations of the region. Rounding out the complement of species are widespread continental and desert species.

The Arizona/New Mexico Highlands are dominated by wildlife species that are characteristic of the southern Rocky Mountains. This ecoregion runs east-west near the north part of the study area (Bailey 1995). These species represent populations now isolated in refugia on the Mogollon Plateau. Some grassland and widespread desert species also occur in the region.

The northern part of the study area occurs in the Colorado Plateau ecoregion (Bailey 1995). Wildlife species there generally are characteristic of species of the Great Basin, southern Great Plains, and southern Rocky Mountains. These species typically occur in grassland, chaparral, conifer woodlands, and cold desertscrub habitats.

Table 2-9 – Listed Species – Known or Potentially Occurring

Common Name	Scientific Name	Status				Habitat Considerations	Potential Occurrence in Project Study Area
		USFWS	STATE	USFS	BLM		
Birds							
American peregrine falcon	*Falco peregrinus anatum*	SC	WSC	S		Steep, sheer cliffs overlooking woodlands, riparian areas or other habitats.	Throughout the study area.
American redstart	*Setophaga ruticilla*		WSC			Mature and secondary growth deciduous and mixed deciduous-coniferous forest with closed canopy and dense midstory vegetation.	White Mountains of Apache County.
Baird's sparrow	*Ammodramus bairdii*	SC	WSC			Usually in extensive expanses of grasslands in dense stands of grass.	Cochise and Santa Cruz counties.
Bald eagle (southwestern population)	*Haliaeetus leucocephalus*	T	WSC	S		Large trees or cliffs near water with abundant prey.	Gila and Graham counties.
Belted kingfisher	*Megaceryle alcyon*		WSC			Rivers, ponds, lakes, and streams.	Apache, Coconino, and Gila counties.
Black-bellied whistling duck	*Dendrocygna autumnalis*		WSC			Found along rivers, ponds, stock tanks, marshes, and swamps.	Cochise and Santa Cruz counties.
Black-billed magpie	*Pica hudsonia*		WSC			Open areas with scattered trees, riparian and open woodlands, croplands and pastures, brushy habitats, and sagebrush communities.	Known populations are outside the study area.
Black-capped gnatcatcher	*Polioptila nigriceps*		WSC			Riparian woodland and associated brushy areas.	Sonoita Creek, Chino Canyon, Florida Wash, Sycamore Canyon, and Kino Spring in Santa Cruz County.
Bobolink	*Dolichonyx oryzivorus*		WSC			Marshes, grasslands, and open woody areas.	Apache and Gila counties.
Cactus ferruginous pygmy-owl	*Glaucidium brasilianum cactorum*	SC	WSC			Sonoran riparian deciduous woodlands within the Arizona Upland subdivision of Sonoran desertscrub at elevations from 1,300 to 4,000 feet.	Santa Rita Mountains in Santa Cruz County; Bonita Creek in Graham County and the San Francisco River in Greenlee County, both near the Gila River.

Common Name	Scientific Name	Status				Habitat Considerations	Potential Occurrence in Project Study Area
		USFWS	STATE	USFS	BLM		
California brown pelican	*Pelecanus occidentalis californicus*	E, PD				Coastal land and islands; species at times found around Arizona lakes and rivers.	Uncommon transient in Arizona; not likely to be found within the study area.
California condor	*Gymnogyps californianus*	E,XN				High desert canyonlands and plateaus.	Experimental/ nonessential area is outside the study area. Foraging condors may be seen within the study area, as they have been known to fly up to 150 miles per day.
Common black hawk	*Buteogallus anthracinus*		WSC	S		Riparian areas, dependent on mature, relatively undisturbed habitat with permanent flowing streams.	Breeding range is along the upper Gila River drainage in Cochise, Gila, Graham, and Greenlee counties.
Eared quetzal	*Euptilotis neoxenus*			S		Pine and oak forests.	The Huachuca and Chiricahua mountains in Cochise County; the Bear Wallow wilderness and Black River in the White Mountains of Greenlee County; and the Sierra Ancha Mountains of Gila County.
Elegant trogon	*Trogon elegans*		WSC			Mesic canyons with riparian forest of various species.	Found in the Atascosa, Chiricahua, Huachuca, and Santa Rita mountains of Cochise and Santa Cruz counties.
Ferruginous hawk	*Buteo regalis*	SC	WSC			Open scrublands, woodlands, grassland and semidesert grasslands at elevations from 3,500 to 6,000 feet in elevation.	Can be seen September to April in almost any part of Arizona.
Gray catbird	*Dumetella carolinensis*		WSC			Riparian scrub willow and alder, ponderosa pine, and piñon/juniper forests.	Nests along upper Little Colorado River from Greer to just north of Springerville and very locally along upper San Francisco River near Alpine in Apache County; also near Show Low in Navajo County.
Great egret	*Ardea alba*		WSC			Marshes, streams, lakes, rivers, ponds, meadows, and fields at elevations up to 1,500 feet.	Known populations are outside the study area.

Common Name	Scientific Name	Status				Habitat Considerations	Potential Occurrence in Project Study Area
		USFWS	STATE	USFS	BLM		
Least bittern	*Ixobrychus exilis*		WSC			Marshes with dense, tall vegetation interspersed with clumps of woody vegetation and open water. Records in Arizona are below 1,500 feet in elevation.	Known populations are outside the study area.
Mexican spotted owl	*Strix occidentalis lucida*	T	WSC	S		Canyons and dense forests with multilayered foliage structures between 4,100 and 9,000 feet in elevation.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, Navajo, and Santa Cruz counties.
Mississippi kite	*Ictinia mississippiensis*		WSC			Riparian deciduous forests bordering desertscrub habitats; also found in some pecan orchards.	San Pedro River in Cochise County.
Mountain plover	*Charadrius montanus*	SC		S	S	Shortgrass and shrub-steppe landscapes.	Breeding population in Apache County, nonbreeding in Cochise County.
Northern aplomado falcon	*Falco femoralis septentrionalis*	E				Grassland and savannah with low ground cover and mesquite or yucca for nesting platforms from 3,500 to 9,000 feet in elevation.	No recent confirmed reports for Arizona; however, observed in eastern Cochise County in 1977.
Northern buff-breasted flycatcher	*Empidonax fulvifrons pygmaeus*	SC	WSC			Open pine or sycamore stands with open understory.	Summer resident, breeding only in the Huachuca and Chiricahua mountains of Cochise County.
Northern goshawk	*Accipiter gentilis*	SC	WSC	S		Deciduous, coniferous, and mixed forests. Nesting in mature and old-growth forests.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, Navajo, and Santa Cruz counties.
Northern gray hawk	*Buteo nitidus maxima*	SC	WSC	S		Riparian woodlands with large trees, generally near mesquite forests.	Watersheds of the San Pedro River and Santa Cruz River in Santa Cruz County; individuals also seen in the San Bernardino National Wildlife Refuge in Cochise County.
Osprey	*Pandion haliaetus*		WSC			Subalpine and montane coniferous forests, occasionally in desert riparian habitats. Nests and feeds near large bodies of water.	Breeds primarily in White Mountains and along Mogollon Rim; may occur almost anywhere in migration. In the lower Colorado River Valley and southeastern Arizona, is an uncommon spring and fall transient, usually seen at ponds or reservoirs.

Common Name	Scientific Name	Status				Habitat Considerations	Potential Occurrence in Project Study Area
		USFWS	STATE	USFS	BLM		
Pine grosbeak	*Pinicola enucleator*		WSC			Coniferous forests with large trees and low to intermediate canopy cover at elevations from 2,000 to 10,000 feet.	White Mountains in Apache County.
Rose-throated becard	*Pachyramphus aglaiae*		WSC			Breeds in sycamore riparian habitats in extreme southcentral Arizona.	Recently found breeding along Sonoita and Arivaca creeks, in Sycamore Canyon (Atascosa Mountains), and in Patagonia in Santa Cruz County.
Southwestern willow flycatcher	*Empidonax traillii extimus*	E	WSC	S		Cottonwood/willow and tamarisk vegetation communities along rivers and streams below 8,500 feet in elevation.	Found in appropriate habitat throughout the study area. Critical habitat within the study area is found in Apache, Cochise, Gila, Graham, and Greenlee counties.
Sprague's pipit	*Anthus spragueii*		WSC			Grasslands and meadows as well as pastures with little to no weedy vegetation.	Winters mainly in San Rafael, Sonoita, and Sulphur Springs grasslands in Cochise and Santa Cruz counties.
Thick-billed kingbird	*Tyrannus crassirostris*		WSC			Deciduous riparian woodlands in semiarid canyons at elevations between 3,000 and 6,500 feet in elevation.	Breeds locally in sycamore riparian habitats at Sonoita Creek (near Patagonia), Sycamore Canyon (Atascosa Mountains) in Santa Cruz County, and Guadalupe Canyon (east of Douglas) in Cochise County. Since 1980, nests locally along the lower San Pedro River, near Cascabel in Cochise County.
Tropical kingbird	*Tyrannus melancholicus*		WSC			Lowlands near water in Arizona, often nesting in cottonwoods.	San Bernardino National Wildlife Refuge and San Pedro River in Cochise County; Santa Cruz River, Sonoita Creek, and Sopori Wash/ Tumacocori Mountains in Santa Cruz County.
Veery	*Catharus fuscescens*		WSC			Riparian areas with dense willows and alders near water.	Breeds irregularly along the South Fork of Little Colorado River west of Eager in Apache County, in restricted riparian habitats.

Common Name	Scientific Name	Status				Habitat Considerations	Potential Occurrence in Project Study Area
		USFWS	STATE	USFS	BLM		
Violet-crowned hummingbird	*Amazilia violiceps*		WSC			Riparian woodlands between 2,800 and 5,500 feet in elevation.	Breeds in Ramsey Canyon (Huachuca Mountains), Dixie Canyon (Mule Mountains), Cave Creek (Chiricahua Mountains), Guadalupe Canyon (Peloncillo Mountains), and Sonoita Creek (near Patagonia) in Cochise and Santa Cruz counties.
Western burrowing owl	*Athene cunicularia hypugaea*	SC			S	Open areas, including grasslands, deserts, prairies, agricultural lands, and vacant lots. Often associated with burrowing mammals.	Throughout the study area in appropriate habitats.
Western yellow-billed cuckoo	*Coccyzus americanus*	C	WSC	S		Large blocks of riparian woodlands (cottonwood, willow, or tamarisk galleries) below 6,500 feet in elevation.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, Navajo, and Santa Cruz counties.
White-faced ibis	*Plegadis chihi*	SC				Freshwater marshes, ponds, and rivers with cattail and bulrush.	May use parts of the study area during migration.
Yuma clapper rail	*Rallus longirostris yumanensis*	E	WSC			Fresh water and brackish marshes below 4,500 feet with dense emergent riparian vegetation.	Known populations are outside the study area.
Fish							
Apache trout	*Oncorhynchus apache*	T	WSC	S		Presently restricted to cold mountain streams with many low-gradient meadow reaches above 5,000 feet in elevation.	Headwater streams of the Salt (Black and White), Little Colorado, and Blue rivers in the White Mountains of Apache and Greenlee counties. Introduced and established outside of natural range in Grant and Ash creeks in the Pinaleño Mountains in Graham County.
Beautiful shiner	*Cyprinella formosa*	T	WSC			Small- to medium-sized streams and ponds with sand, gravel, and rock bottoms below 4,500 feet in elevation.	Reintroduced into four ponds on the San Bernardino National Wildlife Refuge in Cochise County in 1990. Habitat and critical habitat includes all aquatic habitats in the main portion of San Bernadino National Wildlife Refuge.

Common Name	Scientific Name	Status				Habitat Considerations	Potential Occurrence in Project Study Area
		USFWS	STATE	USFS	BLM		
Colorado pikeminnow	*Ptychocheilus lucius*	E	WSC			Eddies and pools in swift, turbid, warm, mainstream rivers below 4,000 feet in elevation.	Known populations are outside the study area.
Desert pupfish	*Cyprinodon macularius*	E				Shallow springs, small streams, and marshes below 5,000 feet in elevation. Tolerates saline and warm water. Only managed populations remain, as natural populations have been extirpated.	Cochise, Graham, and Santa Cruz counties. Critical habitat is outside the study area.
Desert sucker	*Catostomus clarki*	SC			S	Streams and rivers in pools, moving to swift riffles and runs to feed.	The entire Gila River Basin in Cochise, Gila, Graham, and Santa Cruz counties.
Gila chub	*Gila intermedia*	E	WSC	S		Pools, springs, cienegas, and streams between 2,000 and 5,500 feet in elevation.	Santa Cruz River (Cienega Creek, Sabino Canyon, Sheehy Spring), Middle Gila River (Eagle, Bonita, and Harden Cienega creeks and San Carlos and Blue rivers), San Pedro River (Bass, O'Donnell, and Redfield canyons, Babocomari River and Turkey Creek). Critical habitat occurs in Cochise, Gila, Graham, Greenlee, and Santa Cruz counties in the study area.
Gila longfin dace	*Agosia chrysogaster chrysogaster*	SC			S	Intermittent low-desert to higher-elevation small to medium streams.	Cochise, Gila, Graham, and Santa Cruz counties within the Gila River drainage. The Rio Yaqui form (*A. chrysogaster* sp. 1) occurs on the San Bernardino National Wildlife Refuge and the Willcox Playa and its tributaries.
Gila topminnow	*Poeciliopsis occidentalis occidentalis*	E	WSC			Small streams, springs, and cienegas vegetated shallows below 4,500 feet in elevation.	Cochise, Gila, Graham, and Santa Cruz counties within the Gila River drainage.
Gila trout	*Oncorhynchus gilae*	T	WSC			Small, high-mountain streams from 5,000 to 10,000 feet in elevation.	Fish stocked into Dude Creek in 1999 and Raspberry Creek in 2000 in Gila and Greenlee counties.

Common Name	Scientific Name	Status				Habitat Considerations	Potential Occurrence in Project Study Area
		USFWS	STATE	USFS	BLM		
Headwater chub	*Gila nigra*	C				Small- to medium-sized streams, often associated with deep pools and cover such as boulders or vegetation, between 3,000 and 6,700 feet in elevation.	Ash Creek (tributary to San Carlos River), Tonto Creek (tributary to the Salt River), and Spring and Marsh creeks, (tributaries of Tonto Creek) in Gila and Graham counties.
Humpback chub	*Gila cypha*	E	WSC			Large, warm, turbid rivers below 4,000 feet in elevation.	Known populations are outside the study area.
Little Colorado spinedace	*Lepidomeda vittata*	T	WSC	S		Moderate to small streams in pools and riffles with water flowing over gravel and silt between 4,000 and 8,000 feet in elevation.	Endemic to the Little Colorado River and its north-flowing tributaries (Apache, Coconino, and Navajo counties).
Little Colorado sucker	*Catostomus sp.3*	SC	WSC	S		Primarily in pools with abundant cover in small to medium rivers and impoundments.	Upper portion of the Little Colorado River and many of its north-flowing tributaries (Coconino, Navajo, and Apache counties).
Loach minnow	*Tiaroga cobitis*	T	WSC	S		Benthic species of small to large perennial streams with swift, shallow water over cobble and gravel at elevations below 8,000 feet. Recurrent flooding and natural hydrograph are important.	White River (Gila County), North and East forks of the White River (Navajo County), Aravaipa Creek (Graham County), San Francisco and Blue rivers, and Campbell Blue and Eagle creeks (Greenlee County).
Mexican stoneroller	*Campostoma ornatum*	SC	WSC	S		Small streams in shallow riffles and runs, pools, and along undercut banks.	Found only in Rucker Canyon in Cochise County.
Razorback sucker	*Xyrauchen texanus*	E	WSC		S	Riverine and lacustrine areas, generally not in fast-moving water; may use backwaters.	Critical habitat found on the Gila River from the New Mexico/ Arizona border to Coolidge Dam (Gila and Graham counties) and the Salt River from US Highway 60/ State Route 77 to Roosevelt Dam (Gila County).
Roundtail chub	*Gila robusta*	SC	WSC	S		In pools adjacent to riffles and runs in cool to warm water, midelevation streams and rivers. Also inhabits large reservoirs.	Gila County.

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		USFWS	STATE	USFS	BLM		
Sonora chub	*Gila ditaenia*	T	WSC			Perennial and intermittent small to moderate streams with boulders and cliffs.	Sycamore Creek and two of its tributaries (Penasco Creek and an unnamed stream) and Atascosa Mountains in Santa Cruz County. Critical habitat in Sycamore Creek (Santa Cruz County) as well as Yank Spring to the international border, Penasco Creek (2 km), and lower half of unnamed stream entering Sycamore Creek about 2.4 km downstream of Yank Spring.
Sonora sucker	*Catostomus insignis*	SC			S	A variety of warm water rivers and cool water streams.	San Francisco and Gila River drainages in the study area.
Speckled dace	*Rhinichthys osculus*	SC			S	Riffles, runs, and pools of headwaters, creeks, and small to medium rivers.	Apache, Cochise, Coconino, Graham, Greenlee, Navajo, and Santa Cruz counties.
Spikedace	*Meda fulgida*	T	WSC	S		Moderate to large perennial streams with gravel-cobble substrates and moderate to swift velocities over sand and gravel substrates below 6,000 feet in elevation. Recurrent flooding and natural hydrograph important.	Aravaipa Creek in Graham County and Eagle Creek in Greenlee County.
Yaqui catfish	*Ictalurus pricei*	T	WSC			Moderate to large streams with slow current over sand and rock bottoms from 4,000 to 5,000 feet in elevation.	Habitat and critical habitat includes all aquatic habitats in the main portion of San Bernadino National Wildlife Refuge in Cochise County.
Yaqui chub	*Gila purpurea*	E	WSC			Deep pools of small streams, pools, or ponds near undercut banks from 4,000 to 6,000 feet in elevation.	San Bernardino and Leslie Canyon national wildlife refuges in Cochise County. Critical habitat includes all aquatic habitats in the main portion of San Bernadino National Wildlife Refuge.

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		USFWS	STATE	USFS	BLM		
Yaqui longfin dace	*Agosia chrysogaster* ssp. 1	SC			S	Generally found in small- to medium-sized streams with sandy and gravelly bottoms in water less than 0.6 feet in depth. Very rarely found above 5,000 feet in elevation.	The Yaqui River on San Bernardino National Wildlife Refuge, Leslie Creek National Wildlife Refuge, and the Wilcox Playa and its tributaries, including West Turkey Creek and Rucker Canyon in Cochise County.
Yaqui topminnow	*Poeciliopsis occidentalis sonoriensis*	E	WSC			Small- to moderate-sized streams, springs, and cienegas generally in shallows below 4,500 feet in elevation.	Currently only occurs in San Bernardino National Wildlife Refuge in Cochise County.
Zuni bluehead sucker	*Catostomus discobolus yarrowi*	C	WSC	S		Stream reaches having shade and pool riffle habitats with coarse substrates below 6,000 feet elevation. Young prefer quiet shallow areas.	Currently known only in Kin Li Chee Creek on the Navajo Nation in Apache County outside the study area.
Amphibians							
Arizona toad	*Bufo microscaphus*	SC		S		Rocky streams and canyons in the pine-oak belt.	Apache, Coconino, Gila, Graham, Greenlee and Navajo counties.
Chiricahua leopard frog	*Rana chiricahuensis*	T	WSC	S		Streams, rivers, backwaters, ponds, and stock tanks that are mostly free from introduced fish, crayfish, and bullfrogs between 3,300 and 8,900 feet in elevation.	Throughout all counties of the study area.
Great Plains narrow-mouthed toad	*Gastrophryne olivacea*		WSC	S		From mesquite semidesert grasslands to oak woodlands near streams, springs, and rain pools. Often found in burrows or other terrestrial habitats with cover.	Santa Cruz County.
Huachuca/Canelo Hills tree frog	*Hyla wrightorum*	C				Generally found in coniferous forests near ponds, pools, and streams on the ground or in shrubs or trees at elevations from 3,000 to 9,500 feet.	Apache, Cochise, Coconino, Greenlee, Navajo, and Santa Cruz counties.
Lowland leopard frog	*Rana yavapaiensis*	SC	WSC	S		Aquatic systems in desert grasslands piñon-juniper in rivers, streams, pools, beaver ponds, wetlands, springs, earthen cattle tanks, livestock drinkers, canals, and backyard ponds.	Southeastern and central parts of the study area. Gila County has the largest number of records for the species within the study area.

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		USFWS	STATE	USFS	BLM		
Northern leopard frog	*Rana pipiens*		WSC	S		Grasslands, woodlands, and forest in ponds, canals, marshes, springs, and streams.	Apache, Coconino, Graham, Greenlee, and Navajo counties. Also may be present in adjoining counties in central and northern portions of study area.
Plains leopard frog	*Rana blairi*		WSC			Streams, ponds, pools, reservoirs, marshes, and irrigation ditches in desert grasslands and oak and oak-pine woodlands.	Western side of Chiricahua Mountains and adjoining Sulphur Springs Valley in Cochise County.
Ramsey Canyon leopard frog	*Rana subaquavocalis*	CA		S		Artificial ponds at approximately 5,000 feet in elevation.	The Tinker, Brown, and Ramsey canyons on the east slope of the Huachuca Mountains in Cochise County.
Sonora tiger salamander	*Ambystoma tigrinum stebbinsi*	E	WSC			Stock tanks and impounded cienegas at 4,000 to 6,300 feet in elevation.	San Rafael Valley and Huachuca Mountains in Cochise and Santa Cruz counties.
Tarahumara frog	*Rana tarahumarae*	SC	WSC			Canyons and drought-resistant pools in streams with low flows and steep gradients.	Extirpated from Arizona in the 1980s. Experimental population in the Santa Rita Mountains in Santa Cruz County.
Western barking frog	*Eleutherodactylus augusti cactorum*		WSC	S		Limestone, rhyolite, granite, and other rock outcrops in canyons in Madrean evergreen woodlands and woodland-grasslands. It is strongly associated with Naco Group limestone in the Huachuca Mountains. They do not require permanent water.	Cochise and Santa Cruz counties.
Reptiles							
Arizona night lizard	*Xantusia arizonae*			S		Arid and semiarid granite outcroppings and rocky areas among debris.	Known populations are outside the study area.
Arizona ridge-nosed rattlesnake	*Crotalus willardi willardi*		WSC	S		Oak woodland to pine-fir forests near rock crevices.	The Huachuca, Santa Rita, Patagonia, and Whetstone mountains and the Canelo Hills in Cochise and Santa Cruz counties.
Brown vinesnake	*Oxybelis aeneus*		WSC			Madrean evergreen woodlands and semidesert grasslands on brush-covered hillsides and stream and canyon bottoms.	Arivaca Lake, and Tumacacori, Pajarito, and Patagonia mountains in Santa Cruz County.
Desert massasauga	*Sistrurus catenatus edwardsii*		WSC	S		In tobosa grasslands along sloping bajadas with surface rocks.	San Bernardino and Sulphur Springs valleys in Cochise County.

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Giant spotted whiptail	*Aspidoscelis burti stictogrammus*	SC		S	S	Dense, shrubby vegetation near permanent and intermittent streams below 4,500 feet in elevation.	Cochise, Graham, and Santa Cruz counties.
Grand Canyon rattlesnake	*Crotalus oreganos abyssus*			S		Mohave and Great Basin desertscrub near the Grand Canyon.	Known populations are outside the study area.
Maricopa leaf-nosed snake	*Phyllorhynchus browni lucidus*			S		Upland Sonoran desertscrub on alluvial fans and desert basin floors.	Known populations are outside the study area.
Narrow-headed garter snake	*Thamnophis rufipunctatus*	SC	WSC	S		Piñon-juniper and pine-oak woodlands to ponderosa pine forest in perennial streams.	Apache, Coconino, Gila, Graham, Greenlee, and Navajo counties.
New Mexico ridge-nosed rattlesnake	*Crotalus willardi obscurus*	T		S		Primarily canyon bottoms in pine-oak communities between 5,000 and 6,600 feet in elevation.	Peloncillo Mountains in eastern Cochise County.
Northern Mexico garter snake	*Thamnophis eques megalops*	SC	WSC	S		Dense vegetation surrounding wetlands, low-gradient stream wetlands, and stock tanks.	Apache, Cochise, Gila, Navajo, and Santa Cruz counties.
Red-back whiptail	*Aspidoscelis burti xanthonota*	SC		S		Juniper-oak woodlands down to Sonoran uplands in canyons and on hills near streambanks and arroyos.	Known populations are outside the study area.
Sonoran desert tortoise	*Gopherus agassizii* (Sonoran population)	SC	WSC			Primarily on rocky slopes and bajadas of Mojave and Sonoran desertscrub.	Cochise, Gila, Graham, and Santa Cruz counties.
Texas horned lizard	*Phrynosoma cornutum*	SC			S	Sandy to gravelly flat ground in Chihuahuan Desert and desert grasslands and mesquite flats.	Cochise and Graham counties.
Tucson shovel-nosed snake	*Chionactis occipitalis klauberi*				S	Mesquite-creosote scrub in sandy washes, dunes, and rocky hillsides.	Occurrence records for the species all occur outside the study area.
Western black kingsnake	*Lampropeltis getula nigrita*			S		Rock outcrops, rodent burrows, and under vegetation cover in low-elevation desert and is most abundant near water.	Santa Cruz and Cochise counties.
Invertebrates							
Arizona cave amphipod	*Stygobromus arizonensis*	SC		S		Aquatic habitats in subterranean caves and mine tunnels.	Flying "H" Ranch and a small spring in a mine at Paradise in Cochise County.

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		USFWS	STATE	USFS	BLM		
Arizona giant sand treader cricket	*Daihinibaenetes arizonensis*	SC		S	S	Burrows excavated to an approximate depth of 18 inches in sand dunes and sandy washes.	Cottonwood Wash, east-southeast of Petrified Forest National Monument Headquarters in Navajo County.
Arizona giant skipper	*Agathymus aryxna*			S		On agaves, especially *Agave palmeri* on open hillsides, grasslands, and rocky canyons where the plant occurs.	Cochise, Gila, Graham, and Santa Cruz counties.
Arizona metalmark	*Calephelis rawsoni arizonensis*			S		Oak woodlands in riparian canyons where the host plant *Bidens* sp. is found at elevations from 2,350 to 5,500 feet.	Mountains of Cochise, Graham, and Santa Cruz counties.
Arizona water penny beetle	*Psephenus arizonensis*	SC		S		Cold, fast-flowing high-elevation streams.	The Chiricahua Mountains in Cochise County.
Brown springsnail	*Pyrgulopsis sola*	SC		S	S	Endemic to Brown Spring in Yavapai County.	Known population is outside the study area.
Bylas springsnail	*Pyrgulopsis arizonae*	SC		S	S	Springs with water temperatures ranging from 26 to 32 degrees Celsius.	Three springs on the north bank of the Gila River between Bylas and Pima in Graham County.
California floater	*Anodonta californiensis*	SC		S		In areas less than 6 feet deep in unpolluted lakes, reservoirs, and perennial streams.	Apache County.
Chiricahua pine white	*Neophasia terlootii*			S		Pine forests usually above 6,234 feet in elevation.	Cochise, Graham, and Santa Cruz counties.
Clark Peak talussnail	*Sonorella christenseni*	SC		S		At elevations between 6,520 and 9,100 feet on rockslides.	The Pinaleno Mountains, in Graham County.
Cockerell's striate disc (snail)	*Discus shimekii cockerelli*	SC			S	Soggy, cool, moist areas such as stream floodplains without periodic flooding at elevations from 7,000 to 12,000 feet.	Carr Canyon in the Huachuca Mountains of Cochise County.
Felder's orange tip	*Anthocharis cethura*			S		Sonoran and Chihuahuan desertscrub below 5,900 feet in elevation.	Southern part of the study area below 5,900 feet in elevation.
Fossil springsnail	*Pyrgulopsis simplex*	SC		S	S	In the headsprings and upper sections of the outflow of springs.	In a spring near Strawberry in Gila County.
Gila tryonia	*Tyronia gilae*	SC		S		Unnamed spring where the water temperature ranges from 26 to 32 degrees Celsius.	North of Bylas in Graham County.
Grand Canyon cave pseudoscorpion	*Archeolarca cavicola*	SC				Subterranean cave habitats.	Known populations are outside the study area.
Huachuca giant skpper	*Agathymus evansi*			S		Mixed pine-oak-juniper woodland at elevations from 5,600 to 5,800 feet.	Huachuca Mountains of Cochise County and possibly in Santa Cruz County.

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Huachuca springsnail	*Pyrgulopsis thompsoni*	C		S	S	Aquatic areas, small springs with vegetation and slow to moderate flow from 4,500 to 7,200 feet in elevation.	Cochise and Santa Cruz counties.
Kanab ambersnail	*Oxyloma haydeni kanabensis*	E		S	S	Travertine seeps and springs in Grand Canyon National Park.	Known populations are outside the study area.
Maricopa tiger beetle	*Cicindela oregona maricopa*	SC		S	S	Sandy streambanks and near seeps and reservoir banks.	Cochise, Coconino, Gila, Graham, Greenlee, and Navajo counties.
Mexican meadowfly	*Sympetrum signiferum*			S		Vegetated stream pools and slow-flowing creeks from 4,700 to 6,000 feet in elevation.	Cochise and Santa Cruz counties, including Leslie Canyon, and the west side of the Huachuca Mountains just above 6,000 feet to the headwaters of the Santa Cruz River at roughly 4,700 feet.
Mimic talussnail	*Sonorella imitator*			S		Rockslides at elevations from 6,680 to 10,280 feet.	The Pinaleño Mountains in Graham County.
Mountain silverspot butterfly	*Speyeria Nokomis nitocris*			S		Alpine meadows.	Apache and Greenlee counties.
Navajo Jerusalem cricket	*Stenopelmatus Navajo*	SC		S	S	Endemic to sand dunes and sandy washes.	Known populations are outside the study area.
Net-winged midge	*Agathon arizonicus*			S		Swiftly flowing streams at elevations from 6,000 to 9,300 feet.	Gila and Graham counties.
Neumogen's giant skipper	*Agathymus neumoegeni*			S		Deserts, shrubland/ chaparral, shrub-grassland, open, mixed, and conifer woodlands.	Cochise and Santa Cruz counties.
Niobrara ambersnail	*Oxyloma haydeni haydeni*			S	S	Spring areas and areas with damp or saturated wetland plant litter.	Known populations are outside the study area.
Obsolete viceroy butterfly	*Limenitis archippus obsoleta*		S			Stands of willows along major watercourses.	Cochise, Graham, Greenlee, and Santa Cruz counties.
Page spring micro caddisfly	*Metrichia nigritta*	SC				No information available.	Known populations are outside the study area.
Pinaleno monkey grasshopper	*Eumorsea pinaleno*	SC		S		At elevations above 8,900 feet.	The Pinaleño Mountains in Graham County.
Pinaleno mountainsnail	*Oreohelix grahamensis*			S		In litter near talus slopes.	The Pinaleño Mountains in Graham County.
Pinaleno talussnail	*Sonorella grahamensis*	SC		S		Rockslides at elevations from 6,000 to 10,000 feet.	The Pinaleño Mountains in Graham County.
Sabino Canyon damselfly	*Argia sabino*	SC		S		At elevations from 3,000 to 5,000 feet along riparian areas.	One record from Santa Cruz County.

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San Bernadino springsnail	*Pyrgulopsis bernardina*	C		S	S	Small seeps.	San Bernadino Ranch in Cochise County.
Scudder'sdusky wing	*Erynnis scudderi*			S		High-elevation oak woodlands.	Cochise, Santa Cruz, and possibly Graham counties.
Stephan's riffle beetle	*Heterelmis stephani*	C		S		Waterlogged, decomposing wood, leaf litter, and detritus in small springs and seeps at elevations from 5,000 to 7,000 feet.	Madera Canyon in the Santa Rita Mountains of Santa Cruz County.
Three Forks springsnail	*Pyrgulopsis trivialis*	C		S	S	Rheocrene springs, seeps, marshes, spring pools, outflows and cienegas between 8,000 and 8,500 feet in elevation.	Currently limited distribution in the Three Forks and Boneyard Spring complexes in the North Fork/East Fork/ Black River watershed of east-central Arizona in Apache County.
Wet Canyon talussnail	*Sonorella macrophallus*	CA				Talus slopes in heavily vegetated areas at approximately 6,050 feet in elevation.	Wet Canyon in the Pinaleño Mountains in Graham County.
White Mountains water penny beetle	*Psephenus montanus*	SC		S		Cold, fast-flowing streams at elevations from 6,720 to 8,830 feet.	The White Mountains in Apache and Greenlee counties.
Mammals							
Allen's big-eared bat	*Idionycteris phyllotis*	SC			S	Ponderosa pine, piñon-juniper, and riparian woodlands with sycamores, cottonwoods, and willows. Roosts in crevices, caves, and mines.	Throughout the study area.
Arizona shrew	*Sorex arizonae*	SC	WSC	S		Forested slopes with dense canopies.	Cochise and Santa Cruz counties.
American water shrew	*Sorex palustris*		WSC			Boreal and montane riparian habitats at elevations from 8,200 to 9,630 feet.	White Mountains of Apache County.
Arizona myotis	*Myotis occultus*	SC			S	Ponderosa pine and oak-pine woodlands near water in Arizona during the summer. Roosts in caves, mines, and buildings.	Apache, Cochise, Coconino, Gila, Greenlee, and Navajo counties. Possibly present throughout study area.
Big free-tailed bat	*Nyctinomops macrotis*	SC			S	Rugged, rocky and riparian areas. They roost in buildings, caves, and occasionally in holes in trees.	Cochise and Gila counties.
Black-footed ferret	*Mustela nigripes*	E, XN				Grassland plains generally found in association with prairie dogs at elevations below 10,500 feet.	Reintroduced into Aubrey Valley in Coconino County.

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California leaf-nosed bat	*Macrotus californicus*	SC	WSC			Mojave and Sonoran desertscrub.	Cochise, Gila, Graham, Greenlee, and Santa Cruz counties.
Cave myotis	*Myotis velifer*	SC			S	Caves, tunnels, mineshafts, and sometimes under bridges and in buildings in desertscrub of brittlebush, cacti, creosote, and paloverde.	Cochise, Gila, Graham, and Santa Cruz counties.
Chiricahua fox squirrel	*Sciurus nayaritensis chiricahuae*	SC		S		Apache pine-oak forest to Madrean woodlands, mainly in canyon bottoms.	Chiricahua Mountains of Cochise County.
Fringed myotis	*Myotis thysanodes*	SC			S	Deserts, grasslands, and woodlands to ponderosa pine forest at middle elevations ranging from 4,000 to 8,500 feet.	Throughout study area.
Greater western bonneted bat	*Eumops perotis californicus*	SC				Near cliffs and rugged, rocky canyons with abundant crevices in lower and upper Sonoran desertscrub.	Coconino, Cochise, Gila, Graham, and Greenlee counties.
Hualapai Mexican vole	*Microtus mexicanus hualpaiensis*	E	WSC			In dry grass/forb habitats in ponderosa pine forest.	Known populations are outside the study area.
Houserock Valley chisel-toothed kangaroo rat	*Dipodomys microps leucotis*	SC	WSC			Great Basin desertscrub with relatively high shrub cover.	Known population is outside the study area.
Jaguar	*Panthera onca*	E	WSC	S		Found in Sonoran desertscrub up through subalpine conifer forest at elevations from 1,600 to greater than 9,000 feet.	Documented in photographs in 1996 in the Peloncillo Mountains in Cochise County. Historically occurred throughout study area.
Lesser long-nosed bat	*Leptonycteris curasoae yerbabuenae*	E	WSC	S		Desertscrub habitat with agave and columnar cacti present as food plants below 6,000 feet in elevation.	Cochise, Graham, and Santa Cruz counties.
Long-eared myotis	*Myotis evotis*	SC			S	Ponderosa pine and spruce-fir forests at elevations up to 10,000 feet.	Coconino, Greenlee, and Navajo counties. Could be present in other neighboring counties as well.
Long-legged myotis	*Myotis volans*	SC			S	Roosts in abandoned buildings, cracks in the ground, crevices in cliff faces, and behind exfoliating tree bark primarily in coniferous forests; also found in riparian and desert habitats.	Apache, Cochise, Coconino and Gila counties.
Mearns' southern pocked gopher	*Thomomys bottae mearnsi*	SC				Oak-pine, conifer forests, interior chaparral, and piñon-juniper woodlands.	Pinaleño Mountains in Graham County.

Common Name	Scientific Name	Status				Habitat Considerations	Potential Occurrence in Project Study Area
		USFWS	STATE	USFS	BLM		
Mexican gray wolf	*Canis lupis baileyi*	E, XN				Chaparral, grasslands, woodland, and forested areas between 4,000 and 12,000 feet in elevation. May cross desert areas.	Reintroduced in Arizona to Apache-Sitgreaves National Forest.
Mexican long-tongued bat	*Choeronycteris mexicana*	SC	WSC			Mesic areas in mixed oak-conifer forests.	From the Chiricahua Mountains as far north as the Santa Catalina Mountains and as far west as the Baboquivari Mountains.
Mount Graham red squirrel	*Tamiasciurus hudsonicus grahamensis*	E	WSC			Montane upper elevation mature to old-growth forest above 8,000 feet in elevation.	Designated critical habitat in Graham County in the Pinaleño Mountains.
Navajo Mexican vole	*Microtus mexicanus Navaho*	SC	WSC	S		Prostrate thickets of shrubs with dense cover and dry, grassy areas adjacent to ponderosa pine forests.	Navajo Mountain (Navajo County) and Defiance Plateau (Apache County).
New Mexico jumping mouse	*Zapus hudsonius luteus*	C	WSC	S		Moist meadows near streams often with willow at elevations from 6,500 to 9,430 feet.	White Mountains in southern Apache and northern Greenlee counties.
Ocelot	*Leopardus (= Felis) pardalis*	E	WSC			Humid tropical and subtropical forests, savannahs, and semiarid thornscrub below 8,000 feet in elevation.	Cochise and Santa Cruz counties.
Pale Townsend's big-eared bat	*Corynorhinus townsendii pallescens*	SC				Summer day roosts are found in caves and mines from desertscrub to woodlands and coniferous forests. Night roosts are often in abandoned buildings. Hibernation in winter occurs in cold caves, lava tubes, mines, and occasionally in buildings in uplands and mountains.	Cochise, Coconino, Gila, Graham, Navajo, and Santa Cruz counties.
Pocketed free-tailed bat	*Nyctinomops femorosaccus*				S	Lower-elevation deserts around rock cliffs and rugged rock outcrops with day roosts often in rock crevices.	Cochise, Gila, and Graham counties.
Southern pocket gopher	*Thomomys umbrinus intermedius*			S		From low to high deserts, riparian areas, and coniferous forests.	Cochise and Santa Cruz counties.
Spotted bat	*Euderma maculatum*	SC	WSC			Varied habitats from desertscrub through ponderosa pine forest.	Apache, Cochise, Gila, Graham, Greenlee, and Navajo counties.
Springerville pocket mouse	*Perognathus flavus goodpasteri*	SC		S		Plainslike short grassland at elevations from 5,240 to 7,020 feet.	North of Springerville in Apache County and in Gila and Navajo counties.

Common Name	Scientific Name	Status				Habitat Considerations	Potential Occurrence in Project Study Area
		USFWS	STATE	USFS	BLM		
Western red bat	*Lasiurus blossevillii*		WSC			In riparian and other wooded areas at elevations from 1,900 to 7,200 feet. Day roosts are in trees, especially cottonwoods.	Cochise, Gila, Graham, and Santa Cruz counties.
Western small-footed myotis	*Myotis ciliolabrum*	SC			S	Desert, chaparral, riparian areas, and oak-juniper forests. Found in crevices, cracks, holes, snags, hollow trees, buildings, and under rocks in summer. Hibernates in caves and old mines in winter.	Throughout the study area.
Western yellow bat	*Lasiurus xanthinus*		WSC			Found in urban situations with palms and broad leafed deciduous riparian areas at low to middle elevations.	Cochise County.
White-bellied long-tailed vole	*Microtus longicaudus leucophaeus*			S		Grassy meadows, boggy stream bottoms, wetlands, open coniferous forests, and roadsides at elevations from 6,000 to 10,700 feet in the Pinaleño Mountains in Graham County.	Pinaleño Mountains in Graham County.
White Mountains ground squirrel	*Spermophilus tridecemlineatus monticola*			S		Open shortgrass subalpine fields to open grass-sedge meadows in the east-central White Mountains. May also be found in mowed lawns, golf courses, cemeteries, well-grazed pastures, and roadsides at elevations from 8,500 to 9,500 feet.	White Mountains of Apache County.
Wupatki Arizona pocket mouse	*Perognathus amplus cineris*	SC		S		Various desertscrub and scrub oak habitats at elevations from 3,900 and 5,420 feet.	Known species range is outside of the study area.
Yellow-nosed cotton rat	*Sigmodon ochrognathus*	SC				Grassy, dry, rocky, steep slopes up to 40 degrees in or near oak woodlands and montane meadows up to ponderosa pine and Douglas fir forests at elevations from 3,000 to 8,500 feet.	Cochise, Graham, and Santa Cruz counties.
Yuma myotis	*Myotis yumanensis*	SC				Desertscrub, riparian, moist piñon-juniper woodlands at elevations from sea level to 11,000 feet. The species roosts in rocky walls and cliffs near water.	Gila and Graham counties.

Common Name	Scientific Name	Status				Habitat Considerations	Potential Occurrence in Project Study Area
		USFWS	STATE	USFS	BLM		
Plants							
Acuna cactus	*Echinomastus erectocentrus* var. *acunensis*	C	HS			Well-drained knolls and gravel ridges in Sonoran desertscrub between 1,300 and 2,000 feet in elevation.	Known populations are outside the study area.
Alamos deer vetch	*Lotus alamosanus*			S		No information available.	Bear Valley and Sycamore Canyon in Santa Cruz County.
Alcove bog-orchid	*Platanthera zothecina*	SC				Moist streambanks, seeps, and hanging gardens with constant moisture at elevations from 5,000 to 9,000 feet.	Known populations are outside the study area.
American frog orchid	*Coeloglossum viride* var. *virsecens*		SR			Mixed aspen and fir forest among ferns at elevations between 9,000 and 10,000 feet in elevation.	Hannagan Meadow in Greenlee County.
Aravaipa sage	*Salvia amissa*	SC		S	S	Upper floodplain terraces in shady canyon bottoms near streams in the understory of mature sycamore, ash, walnut, and mesquite at elevations from 1,500 to 5,000 feet.	Cochise, Gila, and Graham counties.
Aravaipa wood-fern	*Thelypteris puberula* var. *sonoriensis*				S	In moist soils in the shade of boulders on riverbanks, seepage areas, and meadow habitats.	Known populations are outside the study area.
Arid throne fleabane	*Erigeron arisolius*			S		In grasslands and oak woodlands in grassy openings, or on roadsides. Typically found at elevations from 4,250 to 6,650 feet.	Cochise and Santa Cruz counties.
Arizona alum root	*Huechera glomerulata*			S		North-facing, rocky, shaded slopes in humus soil near seeps, streams, and riparian areas at elevations from 4,000 to 9,000 feet.	Pinaleño, Santa Theresa and Galiuro mountains in Graham County; Santa Catalina and Chiricahua mountains in Cochise County; and Pinal Mountains in Gila County. Also present in Greenlee, southern Apache, and Navajo counties.
Arizona agave	*Agave arizonica*		HS			In Sonoran desertscrub, chaparral, or juniper grassland on open rocky slopes and mesas at elevations from 3,600 to 5,800 feet.	Sierra Ancha Mountains in Gila County.
Arizona bugbane	*Cimicifuga arizonica*	CA	HS	S		Moist, loamy soil between coniferous and riparian ecotones at elevations from 5,300 to 7,000 feet.	Workman Creek and Cold Springs Canyon in the Sierra Ancha Mountains in Gila County.

Common Name	Scientific Name	Status				Habitat Considerations	Potential Occurrence in Project Study Area
		USFWS	STATE	USFS	BLM		
Arizona cliffrose	*Purshia subintegra*	E	HS			Characteristic white soils of tertiary limestone lakebed deposits below 4,000 feet in elevation.	Near Bylas in Graham County.
Arizona giant sedge	*Carex ultra*			S	S	Moist soils near perennially wet springs and streams in rocky-gravelly terrain at elevations from 2,000 to 6,000 feet.	Huachuca, Chiricahua, Dragoon, and Galiuro mountains in Cochise County; Galiuro Mountains in Graham County; and Santa Rita and Atascosa mountains in Santa Cruz County.
Arizona hedgehog	*Echinocereus triglochidiatus* var. *arizonicus*	E	HS	S		Between interior chaparral and madrean evergreen woodland at elevations between 3,700 and 5,700 feet in steep-walled canyons and talus slopes.	Gila County.
Arizona manihoot	*Manihot davisiae*			S		Limestone slopes at elevations from 3,500 to 4,000 feet.	Santa Rita Mountains in Santa Cruz county.
Arizona monkshood	*Aconitum infectum*			S		San Francisco Peaks at elevations from 9,500 to 11,000 feet.	Known populations are outside the study area.
Arizona passionflower	*Passiflora arizonica*			S		Rocky desert hillsides, limestone outcrops, canyon cliffs, and arroyos at elevations from 3,500 to 5,600 feet.	Bartlett Mountain and California Gulch in Santa Cruz County.
Arizona phlox	*Phlox amabilis*			S		Piñon-juniper woodlands, ponderosa pine-gambel oak communities on open, exposed, rocky, limestone slopes at elevations from 3,500 to 7,800 feet.	Gila and Graham counties.
Arizona willow	*Salix arizonica*	CA	HS	S		Unshaded or partially shaded wet meadows, streamsides, cienegas; in or adjacent to water, some dry. Found at elevations between 8,500 and 10,000 feet.	White Mountains in Apache County.
Bartram stonecrop	*Graptopetalum bartramii*	SC	SR	S	S	Shrub oak-grassland communities along arroyos and sides of rugged canyons, usually in heavy litter cover in cracks in rocky outcrops at elevations from 3,650 to 6,700 feet.	Chiricahua Mountains of Cochise County and Patagonia, Santa Rita and Tumacacori mountains in Santa Cruz County.
Bearded gentian	*Gentianopsis barbellata*			S		Wet, rocky meadows and open woods of tundra above the timberline at elevations from 10,000 to 12,000 feet.	Known populations are outside the study area.

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		USFWS	STATE	USFS	BLM		
Beardless chinch weed	*Petcis imberbis*	SC		S		Open grassland and oak-grassland in disturbed areas, including road cuts at elevations from 4,000 to 5,500 feet.	Cochise and Santa Cruz counties.
Bigelow onion	*Allium bigelovii*		SR			Grassland, open chaparral, and desertscrub on gentle slopes at elevations from 2,000 to 5,000 feet.	Coconino, Gila, Greenlee, and Navajo counties.
Bigelow thoroughwort	*Eupatorium bigelovii*			S		Among shrubs near water in rocky terrain at elevations from 8,600 to 9,440 feet.	The Pinaleño Mountains of Graham County.
Blumer's dock	*Rumex orthoneurus*	SC	HS	S		Wetlands and middle to high elevations with moist, organic soil adjacent to perennial springs or streams in canyons or meadows at elevations from 4,480 to 9,660 feet.	Chiricahua Mountains in Cochise County and Sierra Ancha Mountains in Gila County. May be in Apache and Graham counties.
Boreal bog orchid	*Platanthera hyperborea*		SR			Wet, open to semi-open habitats.	Greenlee County.
Box canyon muhly	*Muhlenbergia dubioides*			S		In canyons and along streams on rocky slopes and on cliffs at elevations from 2,750 to 6,000 feet.	Cochise and Santa Cruz counties.
Brady pincushion cactus	*Pediocactus bradyi*	E	HS			Benches and terraces in Navajo desert near Marble Gorge in Coconino County at elevations from 3,850 to 4,500 feet. Soils are from Kaibab limestone over Moenkopi shale and sandstone soil.	Known populations are outside the study area.
Branching penstemon	*Penstemon ramosus*			S		Rocky mountain canyons at elevations from 4,000 to 5,600 feet.	Chiricahua Mountains in Cochise County; Pinaleño Mountains in Graham County; northwest of Clifton in Greenlee County; and possibly the Santa Rita Mountains in Santa Cruz County.
Broad-leaf ground-cherry	*Physalis latiphysa*			S		Desertscrub and grassland washes, often in the shade of boulders or shrubs at elevations from 3,000 to 4,700 feet.	From San Bernardino Valley in Cochise County, the Pinaleño Mountains in Graham County, and the Santa Cruz River in Santa Cruz County.
Broadleaf twayblade	*Listera convallarioides*		SR			Mixed deciduous-coniferous forests in rich humus in open woods to boggy meadows at elevations between 7,000 and 8,600 feet.	Apache County.

Common Name	Scientific Name	Status				Habitat Considerations	Potential Occurrence in Project Study Area
		USFWS	STATE	USFS	BLM		
Button cactus	*Epithelantha micromeris*		SR			On hills and ridges in desert grasslands in the Chihuahuan Desert at elevations from 3,000 to 5,800 feet.	Cochise and Santa Cruz counties.
California barrel cactus	*Ferocactus cylindraceus var. cylindraceus*		SR			Sonoran and Mohave deserts on rocky or gravelly hillsides, canyon walls, alluvial fans, and edges of washes on limestone and igneous soils at elevations from 200 to 2,900 feet.	Gila and Graham counties.
Cameron water-parsley	*Cymopterus megacephalus*	SC		S		On limestone soils in eastern Coconino County and Yavapai County from near Montezuma's Castle. Found at elevations from 4,500 to 7,000 feet.	Known populations are outside the study area.
Canelo Hill's ladies' tresses	*Spiranthes delitescens*	E	HS			Finely grained, highly organic, saturated soils of cienegas at approximately 5,000 feet in elevation.	Four cienegas in southern Arizona: one in Cochise County, and three in Santa Cruz County.
Catalina beardtongue	*Penstemon discolor*		HS	S		Chaparral and pine-oak woodlands in bedrock in cracks at elevations from 4,400 to 7,200 feet.	Gila, Graham, and Santa Cruz counties.
Chihuahuan sedge	*Carex chihuahuensis*			S		Pine-oak forest and riparian woodlands in wet meadows, wetlands, marshy areas, canyon bottoms, and streambeds. Found at elevations from 3,600 to 7,200 feet.	Chiricahua and Huachuca mountains and San Bernardino Valley in Cochise County; Pinaleño Mountains in Graham County; Sierra Anchas in Gila County; and Atascosa and Santa Rita mountains, and Santa Cruz River in Santa Cruz County.
Chihuahuan stickseed	*Hackelia ursina*			S		Oak and pine belts in shade on moist, north-facing slopes at elevations from 5,000 to 8,000 feet.	Springerville in Apache County; Chiricahua Mountains and Silver Peak in Cochise County; Gila County; Pinaleño and Galiuro mountains in Graham County; and northeast of Clifton in Greenlee County.
Chiltepin	*Capsicum annuum* var. *glabriusculum*			S		Desert riparian areas in mesquite and oak woodlands at elevations from 3,600 to 4,400 feet.	Cochise and Santa Cruz counties.
Chiricahua fleabane	*Erigeron kuschei*	SC	SR	S		Shaded, north-facing granite cliffs and ledges with moss cover at elevations from 7,000 to 9,500 feet.	Chiricahua Mountains in Cochise County.

Common Name	Scientific Name	Status				Habitat Considerations	Potential Occurrence in Project Study Area
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Chiricahua mock pennyroyal	*Hedeoma costatum*			S		Mixed pine and oak woodlands on rocky limestone outcrops, cliff faces, and road embankments at an elevation of approximately 6,000 feet.	In Arizona known only from the Huachuca Mountains in Cochise County.
Chiricahua Mountain brookweed	*Samolus vagans*			S		Wet sand at elevations from 3,500 to 6,000 feet.	Cochise and Santa Cruz counties.
Chiricahua rock daisy	*Perityle cochisensis*		SR	S		Moist, north-facing cliff faces at elevations from 5,500 to 7,000 feet.	Chiricahua and Dos Cabeza mountains of Cochise County.
Chiricahua rock cress	*Arabis tricornuta*			S		Pine forests on steep and rocky slopes and on roadbanks at elevations from approximately 6,000 to 8,840 feet.	Chiricahua and Huachuca mountains of Cochise County and the Santa Rita Mountains in Santa Cruz County.
Chiricahua rock flower	*Apacheria chiricahuensis*		SR			Cliff faces, crevices, rock outcrops, and ledges in canyons at elevations from 5,100 to 7,000 feet.	In Arizona known from the Chiricahua and Dragoon mountains in Cochise County.
Chisos coral-root	*Hexalectris revoluta*		SR	S	S	Under trees and shrubs on the edges of canyon bottoms and hillsides leading out of canyons at approximate elevations from 4,500 to 5,200 feet.	Santa Rita Mountains of Santa Cruz County.
Cinder phacelia	*Phacelia serrata*	SC				Primarily in volcanic cinder areas in an around Sunset Crater National Monument at elevations from 5,000 to 7,200 feet.	Known populations are all outside the study area.
Cliff milk-vetch	*Astragalus cremnophylax* var. *myriorrhaphis*	SC	SR	S	S	On canyon edges in the Buckskin Mountains of Coconino County.	Known population is outside the study area.
Cochise pincushion cactus	*Coryphatha robbinsorum*	T	HS			Semidesert grassland with small shrubs, agave, other cacti, and grama grass above 4,200 feet in elevation on gray limestone hills.	Southeastern and southwestern Cochise County.
Coppermine milk-vetch	*Astragalus cobrensis* var. *maguirei*	SC	SR	S		Shady canyons near stream bottoms and lower ledges at elevations from 5,000 to 7,500 feet.	Found in the Chiricahua and Peloncillo mountains of Cochise County and possibly the Pinaleño Mountains of Graham County.
Crenulate moonwort	*Botrychium crenulatum*	SC		S		Marsh habitats with gravelly soils at elevations from 10,000 to 11,000 feet.	Mount Baldy in Apache County.
Crested coral-root	*Hexalectris spicata*		SR			Oak woodlands, canyons, mixed oak-coniferous forests at elevations from approximately 3,500 to 7,000 feet.	Cochise and Santa Cruz counties.

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		USFWS	STATE	USFS	BLM		
Dalhouse spleenwort	*Asplenium dalhousiae*			S		Madrean oak woodlands in shady, rocky, ravines at elevations from 4,000 to 6,000 feet.	The Mule and Huachuca mountains in Cochise County.
Eastwood alum root	*Heuchera eastwoodiae*			S		Ponderosa pine forests and canyons on moist, shaded slopes at elevations from approximately 3,500 to 7,900 feet.	Christopher Creek, Mogollon Rim south of Woods Canyon Lake, and Sierra Ancha in Gila County.
Elusive new browallia species	*Browallia eludens*	SC		S		Madrean evergreen woodland in moist summer habitats.	The Canelo Hills of Santa Cruz County.
Escoba	*Marina diffusa*			S		No information available.	Santa Cruz County.
Fallen ladies'-tresses	*Schiedeella arizonica*		SR			Mixed coniferous-deciduous forest at elevations from approximately 6,500 to 9.300 feet.	Apache, Cochise, Graham, Greenlee, and Santa Cruz counties.
Fickeisen plains cactus	*Pediocactus peeblesianus* var. *fickeiseniae*	C	HS	S		Exposed layers of Kaibab limestone on canyon margins or hills of Navajo desert at elevations from 4,000 to 5,000 feet.	Known populations are outside the study area.
Fish Creek rock daisy	*Perityle saxicola*	SC		S		Very xeric habitats on steep slopes from cracks and crevices in cliff faces, large boulders, and rocky outcrops on limestone soils at elevations from approximately 2,000 to 3,800 feet.	Gila County.
Fish Creek fleabane	*Erigeron piscaticus*	SC	SR	S	S	Moist sandy canyon bottoms with perennial streams at elevations from 2,250 to 3,500 feet.	Galiuro Mountains in Graham County.
Flagstaff beardtongue	*Penstemon nudiflorus*			S		Ponderosa pine forests at elevations from 4,500 to 7,000 feet.	Possibly in the study area in Coconino County, though unlikely as it is found nearer to the Grand Canyon.
Flagstaff pennyroyal	*Hedeoma diffusum*		SR	S		Ponderosa pine on rock pavement, cliff limestone at elevations from 4,500 to 7,200 feet.	Known populations are outside the study area.
Flannel bush	*Fremontodendron californicum*		SR		S	Chaparral and oak-pine woodlands on rocky hillsides and ridges on dry, north-facing slopes at elevations from 3,500 to 6,500 feet.	Mazatzal Mountains of Gila County.
Gentry indigo bush	*Dalea tentaculoides*	SC	HS	S	S	Canyon bottoms with occasional flooding and disturbance at elevations from 3,600 to 4,600 feet.	Santa Cruz County.

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		USFWS	STATE	USFS	BLM		
Gladiator milk-vetch	*Astragalus xiphoides*	SC	SR			Grasslands and alluvial plains on Chinle and Moenkopi formations at elevations from approximately 5,000 to 6,000 feet.	Apache and Navajo counties.
Gila groundsel	*Senecio quaerens*	SC	SR	S		In Arizona associated with ponderosa pine among damp shrubby or grassy hummocks at elevations from 7,500 to 9,100 feet.	The White Mountains of Apache and Greenlee counties.
Gila rock daisy	*Perityle gilensis* var. *salensis*			S		No information available.	Gila County.
Golden barrel cactus	*Ferocactus cylindraceus var. eastwoodiae*		SR			No information available.	Gila County.
Gooddings onion	*Allium gooddingii*	CA SC	HS	S		Forested drainage bottoms and on moist north-facing slopes of mixed conifer and spruce fir forests above 7,500 feet in elevation.	White Mountains of Apache County.
Grand Canyon beavertail cactus	*Opuntia basilaris* var. *longiareolata*		SR			Mojave and Great Basin deserts.	Known populations are outside the study area.
Grand Canyon catchfly	*Silene rectiramea*	SC				North facing slopes between 5,600 and 6,800 feet in elevation.	Known populations are outside the study area.
Grand Canyon cottontop cactus	*Echinocactus polycephalus* var. *xeranthemoides*		SR			Rocky hills, slopes, and ledges of canyons, in Great Basin and Mohave Desert scrub.	Known populations are outside the study area.
Grand Canyon evening-primrose	*Camissonia specuicola* ssp. *hesperia*	SC				Opens slopes and rock crevices often on limestone at elevations from 1,200 to 4,500 feet.	Known populations are outside the study area.
Grand Canyon flaveria	*Flaveria mcdougallii*		SR			Hanging gardens in springs or seeps.	Known populations are outside the study area.
Grand Canyon primrose	*Primula specuicola*		SR			Seeps and springs in hanging gardens.	Known populations are outside the study area.
Grand Canyon rose	*Rosa stellata* ssp. *abyssa*	SC	SR	S	S	On or near canyon rims or the tops of cliffs at the edges of mesas or plateaus.	Known populations are outside the study area.
Green death camas	*Zigadenus virescens*		SR			Coniferous forests at elevations from 6,500 to 11,000 feet.	The White Mountains in Apache County and the Huachuca Mountains in Cochise County.
Greene milkweed	*Asclepias uncialis*	SC		S		Plains grassland-shortgrass communities on open hills at the base of mesas, canyons, and bluffs at elevations from 4,000 to 6,400 feet.	Coconino and Santa Cruz counties.

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		USFWS	STATE	USFS	BLM		
Gumbo mild-vetch	*Astragalus ampullarius*	SC		S		Gumbo knolls are composed of fine-grained clay.	Known populations are outside the study area.
Heathleaf wild-buckwheat	*Eriogonum ericifolium* var. *ericifoilium*			S		Dry, gravelly to rocky slopes in mixed grasslands, chaparral, and oak-woodlands.	Coconino County.
Hohokam agave	*Agave murpheyi*	SC	HS	S	S	On benches or alluvial terraces on gentle bajada slopes above major drainages in Sonoran desertscrub.	Roosevelt Lake, Mazatzal and Sierra Ancha mountains, and Tonto Basin in Gila County.
House rock fishhook cactus	*Sclerocactus sileri*		SR			Sandstone to sandy soil at elevations from 5,000 to 6,300 feet.	Known populations are outside the study area.
Huachuca golden aster	*Heterotheca rutteri*	SC		S	S	Open, level grasslands and on road cuts and disturbed sites at elevations between 4,500 and 6,500 feet.	Cochise and Santa Cruz counties.
Huachuca groundsel	*Senecio multidentatus* var. *huachucanus*		HS	S		North-facing shaded slopes on granite rock outcroppings or stabilized talus at elevations from 7,000 to 9,500 feet.	Huachuca and Chiricahua mountains of Cochise County and the Santa Rita Mountains in Santa Cruz County.
Huachuca milk-vetch	*Astragalus hypoxylus*	SC	SR	S	S	Oak-juniper-piñon woodlands in open limestone, rocky clearings on hillsides with slopes of 25 to 30 percent at elevations from 5,300 to 6,100 feet.	The Huachuca Mountains in Cochise County and Patagonia Mountains in Santa Cruz County.
Huachuca morning glory	*Ipomoea plummerae var. cuneifolia*			S		Pine forests and chaparral in open wet areas and rocky to gravelly slopes at elevations from 4,500 to 9,000 feet.	The White Mountains of Apache County; the Chiricahua and Huachuca mountains of Cochise County, and the Patagonia and Santa Rita mountains of Santa Cruz County.
Huachuca mountain lupine	*Lupinus huachucanus*			S		Pine forest on moderate to steep slopes at elevations from 5,000 to 6,700 feet.	The Chiricahua and Huachuca mountains in Cochise County and the Santa Rita Mountains in Santa Cruz County.
Huachuca water umbel	*Lilaeopsis schaffneriana* var. *recurva*	E	HS			Cienegas, perennial low-gradient streams, wetlands between 3,500 and 6,500 feet in elevation.	Huachuca Mountains, San Pedro area, and San Bernardino Valley/Black Draw in Cochise County; in Canelo Hills/Turkey Creek, Sonoita Creek, and San Rafael Valley in Santa Cruz County.
Incense corycactus	*Escobaria tuberculosa*		SR			Deserts, grasslands, oak-juniper, and creosotebush scrub at elevations from 1,600 to 5,900 feet.	The Peloncillo and Chiricahua Mountains of Cochise County.

Common Name	Scientific Name	Status				Habitat Considerations	Potential Occurrence in Project Study Area
		USFWS	STATE	USFS	BLM		
Intermediate fishhook cactus	*Sclerocactus parviflorus* ssp. *intermedius*		SR			No information available.	Possibly in the study area in Apache, Coconino, and Navajo counties.
Kaibab bladderpod	*Lesquerella kaibabensis*	SC		S		Limestone-clay knolls with a high percentage of exposed rock.	Known populations are outside the study area.
Kaibab paintbrush	*Castilleja kaibabensis*			S		Fine silts and clays to rocky gravelly meadow soils derived from weathered Kaibab limestone.	Known populations are outside the study area.
Kaibab pincushion cactus	*Pediocactus paradinei*	SC	HS	S	S	Fairly open, mostly level sites on alluvial fans, valley bottoms and ridge tops.	Known populations are outside the study area.
Lace-leaf rockdaisy	*Perityle ambrosiifolia*				S	In fissures and crevices in conglomerate rock near seeps and waterfalls with high desert above and riparian areas below at elevations from 1,800 to 4,900 feet.	Known from the cliffs above Eagle Creek and the San Francisco River in Greenlee County
Large-flowered blue star	*Amsonia grandiflora*	SC		S		Emory oak woodlands in canyon sides and bottoms at elevations from approximately 3,650 to 4,500 feet.	Santa Cruz County.
Leafy lobelia	*Lobelia fenestralis*		SR			In grasslands in moist meadows and swales at elevations from 3,500 to 6,000 feet.	Chiricahua and Huachuca mountains of Cochise County, near Patagonia, and in the San Rafael Valley of Santa Cruz County. Possibly in Apache County near Sheep Crossing.
Lemmon cloak-fern	*Notholaena lemmonii*	SC				Limestone cliff crevices and slopes of igneous rock at elevations from 2,800 to 6,000 feet.	Atascosa and Tumacacori mountains in Santa Cruz County.
Lemmon fleabane	*Erigeron lemmonii*	C	HS			Grows in dense clumps in crevices, ledges, and boulders in canyon bottoms in pine-oak woodland between 6,300 and 7,300 feet in elevation.	Scheelite Canyon and Huachuca Mountains in Cochise County; one site is on Fort Huachuca.
Lemmon lily	*Lilium parryi*	SC	SR	S		Canyon bottoms along perennial streams or hillside streams where soils remain saturated, or nearly so, year-round at elevations from 5,500 to 7,800 feet.	Huachuca and Chiricahua mountains of Cochise County and the Santa Rita Mountains of Santa Cruz County.
Lemmon's lupine	*Lupinus lemmonii*			S		No information available.	Cochise and Greenlee counties.

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		USFWS	STATE	USFS	BLM		
Lemmon milkweed	*Asclepias lemmonii*			S		In canyons, roadsides, and open woodlands at elevations from 5,000 to 7,200 feet.	Huachuca and Chiricahua mountains in Cochise County; Santa Rita Mountains in Santa Cruz County.
Lemmon's stevia	*Stevia lemmonii*			S		Oak and pine-oak forests on rocky, north-facing canyon slopes, ravines, and streambeds at elevations from 3,000 to 4,600 feet.	Patagonia Mountains in Santa Cruz County.
Lesser rattlesnake plantain	*Goodyera repens*		SR			Mixed fir, spruce, aspen, and conifer forests in moderate to heavy shade at elevations from 8,000 to 10,000 feet.	Apache and Greenlee counties.
Limestone Arizona rosewood	*Vauquelinia californica* ssp. *pauciflora*	SC	SR			Desertscrub and desert grasslands on rocky slopes and hillsides.	Known populations are outside the study area.
Lumholtz nightshade	*Solanum lumholtzianum*			S		Washes and low ground near wet depressions and streambanks in disturbed areas at elevations from 3,000 to 4,600 feet.	Santa Rita Mountains in Santa Cruz County.
Madrean adder's mouth	*Malaxis corymbosa*		SR			Shaded mountain canyons at elevations of approximately 6,500 feet.	Cochise and Santa Cruz counties.
Mapleleaf false snapdragon	*Mabrya acerifolia*			S		Rock overhangs, shaded cliffs, and rock ledges at elevations from 1,800 to 3,350 feet.	Known populations are outside the study area.
Marble Canyon milk-vetch	*Astragalus cremnophylax* var. *hevronii*			S	S	Crevices of Kaibab limestone at elevations from 5,200 to 5,400 feet.	Known populations are outside the study area.
Magenta-flower hedgehog cactus	*Echinocereus fasciculatus*		SR			Desertscrub, semidesert grasslands, and interior chaparral on sand, gravel, rocks of hillsides and hilltops at elevations from 1,800 to 5,600 feet.	Cochise, Gila, Graham, and Santa Cruz counties.
Maguire's penstemon	*Penstemon linarioides* ssp. *maguirei*		SR			Great Basin conifer woodlands on rocky hillsides and limestone cliffs at elevations from 6,000 to 6,500 feet.	The Gila River Valley in Greenlee County.
Mazatzal triteleia	*Triteleia lemmoniae*		SR			Sparse pine woodlands at elevations from 3,200 to 7,680 feet.	Apache, Coconino, Gila, and Navajo counties.
Mexican bare-ray-aster	*Psilactis gentryi*			S		Moist habitats, highland meadows, fields, roadsides, and stream and lake margins at elevations from 5,900 to 9,180 feet.	The Huachuca Mountains of Cochise County.
Mexican broomspurge	*Euphorbia gracillima*			S		Relatively bare areas on altered soils, streambanks, desert pavement at elevations from 2,200 to 2,900 feet.	Known populations are outside study area.

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Mexican hemlock parsley	*Conioselinum mexicanum*	SC		S		Cool, shaded mountain slopes at elevations from 6,000 to 9,000 feet.	The Huachuca Mountains of Cochise County and along the San Francisco River of Greenlee County.
Mexican lobelia	*Lobelia laxiflora*		SR			Canyon bottoms and woodland habitats among rocks and under trees and along streams and seeps at elevations from 3,680 to 5,000 feet.	Sycamore Canyon in Santa Cruz County.
Michoacan ladies'-tressses	*Stenorrhynchos michuacanum*		SR			Open grassy slopes, pine-oak woodlands at elevations from 6,200 to 7,200 feet.	Cochise and Santa Cruz counties.
Missouri corycactus	*Coryphantha missouriensis*		SR			Ponderosa pine, piñon-juniper, or *Quercus gambelii* woodlands.	Possibly Navajo and Coconino counties.
Mock pennyroyal	*Hedeoma dentatum*			S		Oak woodland, oak-pine forest, and pine forests on fairly open slopes, roadcuts, steep rocky outcrops, and gravelly slopes at elevations from 3,850 to 8,200 feet.	Cochise and Santa Cruz counties; in the Chiricahua, Huachuca, Mule, Whetstone and Winchester mountains in Cochise County; the Pinaleño Mountains in Graham County; and the Atascosa, Mustang, Pajarito, and Santa Rita mountains in Santa Cruz County.
Mogollon columbine	*Aquilegia desertorum*		SR			Ponderosa pine on ledges, bluffs, in potholes and clefts of Kaibab limestone, generally at elevations from 5,000 to 7,500 feet.	Coconino County.
Mogollon fleabane	*Erigeron anchana*	SC		S		Chaparral to pine forests on granite cliff faces, rock crevices, or on boulders at elevations from 3,500 to 7,000 feet.	Sierra Ancha, Pine, Mazatzal, and Mescal mountains in Gila County.
Mogollon thistle	*Cirsium parryi* ssp. *mogollonicum*	SC	SR	S		Arizona endemic, found on moist to very moist soils in shaded riparian understories, restricted to less than 1 square mile of habitat on the Mogollon Rim at an elevation of 7,200 feet.	Southern Coconino County.
Mount Dellenbaugh sandwort	*Arenaria abberans*			S		Oak and pine forest at elevations from 5,500 to 9,000 feet.	Coconino County and possibly Gila County.
Navajo bridge cactus	*Opuntia nicholii*		SR			Barren areas with saltbush and ephedra, and limestone or red, sandy soils.	Known populations are outside the study area.
Navajo sedge	*Carex specuicola*	T	HS			Silty soils at shady seeps and springs between 5,700 and 6,000 feet elevation.	Known populations are outside the study area.

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Needle-spined pineapple cactus	*Echinomastus erectocentrus* var. *erectocentrus*	SC	SR	S		Upland desert or semidesert grasslands on gentle slopes, hills, and alluvial fans at elevations from 2,850 to 4,960 feet.	Western Cochise County.
Nichol's Turk's-head cactus	*Echinocactus horizonthalonius var. nicholii*	E	HS			Sonoran desertscrub from 2,400 to 4,100 feet elevation.	Known populations are outside the study area.
Night-blooming cereus	*Peniocereus greggii* var. *greggii*	SC	SR			Chihuahuan Desert in sandy or gravelly loams, along washes, on creosotebush flats or gentle slopes at elevations from 3,900 to 4,950 feet.	Cochise County.
Nodding blue-eyed grass	*Sisyrinchium cernuum*			S		Moist areas, meadows, and stream banks at elevations from 3,250 to 7,900 feet.	Cochise and Santa Cruz counties.
Nutrioso milk-vetch	*Astragalus nutriosensis*	SC	SR			Mesa tops at elevations from 7,190 to 7,780 feet.	Apache County along Nutrioso Creek.
Our lord's candle	*Yucca whipplei*		SR			Desert chaparral and desert woodland.	Known populations are outside the study area.
Paper-spined cactus	*Pediocactus papyracanthus*	SC	SR			Grasslands and piñon-juniper associated with grama grass at elevations from 5,000 to 7,300 feet.	Southern Navajo County on the middle Little Colorado River and possibly in Apache County.
Paradine (Kaibab) plains cactus	*Pediocactus paradinei*	CA SC	HS	S	S	Piñon-juniper woodland and shrub grassland at elevations above 4,500 feet.	Known populations are outside the study area.
Parish alkali grass	*Puccinellia parishii*	SC	HS			Open, moist, saline microhabitats at elevations from 2,780 to 7,350 feet.	Known populations are outside the study area.
Peebles Navajo cactus	*Pediocactus peeblesianus* var. *peeblesianus*	E	HS			Gravely soils of the shinarump conglomerate of the Chinle Formation.	Navajo County.
Pima Indian mallow	*Abutilon parishii*	SC	SR	S	S	In higher elevational Sonoran desertscrub on rocky hillsides, cliff bases, canyon bottoms and on secondary terraces in riparian areas at elevations from 1,720 to 4,900 feet.	Santa Rita and Tumacacori mountains of Santa Cruz County and Graham County.
Pima pineapple cactus	*Coryphantha scheeri var. robustispina*	E	HS			Sonoran desertscrub or semidesert grassland at elevations from 2,300 to 5,000 feet in rocky to sandy or silty soils.	Santa Cruz County.
Pinalenos fleabane	*Erigeron heliographis*	SC				Mixed conifer forests on granite rocky cliffs and outcrops in somewhat mesic areas at elevations from 8,500 to 10,400 feet.	The Pinaleño Mountains of Graham County.

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		USFWS	STATE	USFS	BLM		
Pinaleno hedgehog cactus	*Echinocereus ledingii*		SR			Cracks and crevices of rocks or in decomposed rock at the base of outcrops on slopes and among boulders at elevations from 4,000 to 7,400 feet.	Cochise and Graham counties.
Pinaleno jacob's ladder	*Polemonium flavum*			S		Coniferous forests in rich, moist soil at elevations from 7,500 to 9,500 feet.	Pinaleño Mountains in Graham County.
Pinos altos flame flower	*Talinum humile*	SC	SR	S		Semidesert grassland to Madrean evergreen woodlands in well-drained rhyolitic soils terraces at elevations from 6,000 to 8,000 feet.	Santa Cruz County.
Playa spider plant	*Cleome multicaulis*	SC	SR			Saline playas and springs in and around alkali sinks, alkaline meadows, or lakebeds at elevations from 3,600 to 4,200 feet.	Cochise County.
Plummer onion	*Allium plummerae*		SR			Mountain stream banks, wet meadows, and rocky slopes at elevations from 4,800 to 9,000 feet.	The Chiricahua and Huachuca mountains and Leslie Canyon in Cochise County.
Porsild's starwort	*Stellaria porsildii*			S		Pine, Douglas fir, and oak forests and open meadows in partially shaded understory at elevations from 8,000 to 9,200 feet.	The Chiricahua Mountains of Cochise County.
Pringle hawkweed	*Hieracium pringlei*	SC		S		Pine-oak forests on steep slopes, ridges, and stable terraces in canyon bottoms at elevations from approximately 5,200 to 7,500 feet.	The Huachuca and Chiricahua mountains of Cochise County and the Santa Rita Mountains of Santa Cruz County.
Purple adder's mouth	*Malaxis porphyrea*		SR			Mixed-conifer forest at elevations from approximately 6,900 to 9,200 feet.	Verified from Apache, Cochise, Coconino, and Santa Cruz counties and likely in Graham and Greenlee counties.
Redflower onion	*Allium rhizomatum*		SR	S		Juniper-oak woodlands, grassy mountain slopes, grasslands and along streams in moist, rocky places at elevations from approximately 4,400 to 7,000 feet.	The Huachuca, Mule, and Chiricahua mountains in Cochise County, and the Canelo Hills in Santa Cruz County.
Ripley wild-buckwheat	*Eriogonum ripleyi*	SC	SR	S		Tertiary lakebeds on limestone-derived soils at elevations from 2,000 to 6,000 feet.	Western edge of study area is at the boundary of the eastern edge of known populations in Arizona.
Roaring springs prickly poppy	*Argemone arizonica*	SC				Piñon-juniper and desertscrub at elevations from 6,000 to 6,800 feet.	Known populations are outside the study area.

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Rock fleabane	*Erigeron saxatilis*			S		Sheer canyon walls, moist north-facing slopes, steep solid rock and bedrock outcrops at elevations from 4,400 to 8,350 feet.	Coconino County.
Rocky Mountain bristlecone pine	*Pinus aristata*		SR			San Francisco Peaks.	Known populations are outside of study area.
Roundleaf errazurizia	*Errazurizia rotundata*		SR		S	Sandy sites ranging from sandstone sands to gravelly soils and alluvial cinders at elevations from 4,620 to 5,200 feet.	Navajo County.
Rusby hawkweed	*Hieracium rusbyi*			S		Mixed-conifer forests at elevations from 8,000 to 9,300 feet.	The Pinaleño Mountains in Graham County, and the Chiricahua and Huachuca mountains in Cochise County.
Rusby's milk-vetch	*Astragalus rusbyi*			S		Ponderosa pine forests in openings or meadows on dry basaltic soils at elevations from 7,000 to 8,000 feet.	Known populations are outside the study area.
Saiya	*Amoreuxia gonzalezii*	SC	HS	S		Rocky limestone hills at elevations from 4,200 to 4,600 feet.	The Santa Rita Mountains of Santa Cruz County.
San Carlos wild-buckwheat	*Eriogonum capillare*	SC	SR			Disturbed sites with limited competition, including sandy riverbeds, slopes, roadsides, and road cuts at elevations from 1,960 to 4,400 feet.	Cochise, Gila, Graham, and Greenlee counties.
San Francisco Peaks groundsel	*Senecio franciscanus*	T	HS			Talus slopes in alpine tundra above 10,900 feet elevation.	Known populations are outside the study area.
San Pedro River wild buckwheat	*Eriogonum terrenatum*			S		Creosotebush communities at elevations from 3,520 to 3,920 feet.	Cochise County.
Santa Cruz beehive cactus	*Coryphantha recurvata*		HS	S		Desert grassland and oak woodland in alluvial soils on rocky hillsides and crevices at elevations from 3,680 to 6,000 feet.	Santa Cruz County.
Santa Cruz star leaf	*Choisya mollis*	SC		S		Madrean evergreen woodlands on the bottoms and slopes of canyons on gravelly, sandy, and cobbly loams at elevations from 4,000 to 4,900 feet.	Santa Cruz County.
Santa Cruz striped agave	*Agave parviflora* ssp. *parviflora*	SC	HS	S		Desert grassland and oak woodland on open rocky or gravelly ridges at elevations from 3,560 to 5,200 feet.	Santa Cruz County.
Seemann groundsel	*Senecio carlomasonii*			S		Shaded or partially shaded canyon bottoms at elevations from 2,950 to about 7,875 feet.	Cochise and Santa Cruz counties.

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Sentry milk vetch	*Astragalus cremnophylax* var. *cremnophylax*	E	HS			On Kaibab limestone with little soil in piñon-juniper above 4,000 feet elevation.	Known populations are outside the study area.
Shade violet	*Viola umbraticola*			S		Riparian areas in ponderosa pine and pine-juniper-oak at elevations from 5,200 to 7,500 feet.	Chiricahua and Huachuca mountains in Cochise County and the Santa Rita Mountains in Santa Cruz County.
Siler pincushion cactus	*Pediocactus sileri*	T	HS		S	On gypsiferous clay and sandy soils of the Moenkopi Formation in desertscrub transitional areas of Navajo sagebrush and Mohave deserts. Elevation ranges from 2,800 to 5,400 feet.	Known populations are outside the study area.
Simpson's plains cactus	*Pediocactus simpsonii*		SR			Piñon-juniper in powdery soils.	Possibly Apache and Coconino counties.
Slender adder's mouth	*Malaxis tenuis*		SR			No information available.	Cochise County.
Slender bog orchid	*Platanthera purpurascens*		SR			Stream banks, shores, ditches, fens, seeping slopes, and roadsides at elevations from 8,000 to 10,800 feet.	Apache, Graham, and Greenlee counties.
Slender evening primrose	*Camissonia exilis*	SC	SR			Desert shrub communities restricted to calcium-rich deposits sandy-textured saline soil at elevations from 3,500 to 5,000 feet.	Known populations are outside the study area.
Slender needle corycactus	*Coryphantha scheeri* var. *valida*		SR			Deserts and grasslands on deep, sandy soils of flats and bottomlands at elevations from 3,900 to 4,800 feet.	Cochise and Santa Cruz counties.
Small flower fishhook cactus	*Sclerocactus parviflorus* ssp. *parviflorus*		SR			No information available.	Possibly in Navajo and Coconino counties.
Smooth baby bonnets	*Coursetia glabella*	SC		S		Madrean oak woodland, oak-juniper, and pine forest on partially shaded slopes at elevations from 5,000 to 7,200 feet.	Huachuca and Chiricahua mountains of Cochise County; the Patagonia Mountains and Canelo Hills of Santa Cruz County.
Staghorn cholla	*Cylindropuntia versicolor*		SR			Sonoran desertscrub, flats, washes, rocky hillsides, and canyons.	Cochise and Santa Cruz counties.
Sonoran noseburn	*Tragia laciniata*			S		Open woodlands on shaded hillsides, along streams, and in canyon bottoms at elevations from 3,500 to 5,680 feet.	Cochise and Santa Cruz counties.

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Standley Whitlow grass	*Draba standleyi*	SC				Crevices and cracks of igneous rocks and boulders in moist, shaded microclimates at elevation from 5,000 to 9,260 feet with an unverified record at 11,320 feet.	Verified populations are known from the Chiricahua Mountains of Cochise County and an unverified location in the White Mountains of Apache County.
Sunset Crater beardtongue	*Penstemon clutei*	SC	SR	S		Cinder fields devoid of soil and with sparse vegetation at elevations from 6,100 to 8,500 feet.	Known populations are north of the study area.
Superb beardtongue	*Penstemon superbus*			S		Piñon-juniper and oak woodlands in rocky canyons, along sandy and gravelly washes and on dry hillsides at elevations from 3,100 to 5,500 feet.	Cochise, Gila, Graham, Greenlee, and Santa Cruz counties.
Supine bean	*Macroptilium supinum*	SC	SR	S		Oak-juniper woodlands and semidesert grasslands at elevations from 3,600 to 4,900 feet.	Santa Cruz County.
Sweet acacia	*Acacia farnesiana*			S		Desert grasslands and oak woodlands on lower slopes in canyons, on arroyos and hillsides at elevations from 2,500 to 5,000 feet.	Atascosa Mountains of Santa Cruz County.
Sweet cicely	*Osmorhiza brachypoda*			S		Woodlands, coniferous forests, moist ravines and riparian areas at elevations from 3,400 to 7,000 feet.	Sierra Ancha and Mazatzal mountains of Gila County.
Tepic flame flower	*Talinum marginatum*	SC	SR	S		Pine-oak woodlands and at the transition zone between Madrean evergreen and semidesert grassland communities at elevations from approximately 5,000 to 7,025 feet.	Ramsey, Bear, and Brown canyons in the Huachuca Mountains of Cochise County; the Canelo Hills of Santa Cruz County.
Texas purple spike	*Hexalectris warnockii*	SC	HS	S	S	Edges of canyon bottoms and on hillsides leading up from canyons at elevations from approximately 4,500 to 5,200 feet.	Santa Rita Mountains in Santa Cruz County.
Texas rainbow cactus	*Echinocereus pectinatus* var. *pectinatus*		SR			Rocky areas at elevations from 4,000 to 6,000 feet.	Cochise and Santa Cruz counties.
Thornber fishhook cactus	*Mammillaria thornberi*		SR			Sonoran desertscrub under shrubs in silty or sandy soils.	Known populations are outside the study area.
Thurber's bog orchid	*Platanthera limosa*		SR			Near springs, seeps, near streambanks, and in moist woods.	Cochise County.
Thurber hoary pea	*Tephrosia thurberi*			S		Dry slopes among oaks and pines at elevations from 4,500 to 7,000 feet.	Cochise and Santa Cruz counties.

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Thurber's morning glory	*Ipomoea thurberi*			S		Madrean oak woodland and semidesert grasslands on rocky hillsides and canyon slopes at elevations from approximately 3,800 to 5,150 feet.	Huachuca Mountains in Cochise County; Canelo Hills and Patagonia and Pajarito/Atascosa mountains in Santa Cruz County.
Tonto basin agave	*Agave delamateri*	SC	HS	S		Desertscrub and occasionally in juniper-grassland or chaparral, usually atop benches at the edges of slopes and on open slopes at elevations from 2,350 to 5,100 feet.	Sierra Ancha Mountains of Gila County.
Toumey agave	*Agave toumeyana* var. *bella*		SR			Gravelly to rocky limestone or basalt slopes, in desertscrub, chaparral, and piñon-juniper woodlands.	Gila County.
Toumey groundsel	*Senecio neomexicanus* var. *toumeyi*			S		Oak chaparral and occasionally in pine forest at elevations from 3,000 to 9,000 feet.	Chiricahua and Huachuca mountains in Cochise County; also reported from the Pinal Mountains in Gila County.
Trans-Pecos Indian paintbrush	*Castilleja nervata*			S		Unknown.	Cochise and Santa Cruz counties.
Tumamoc globeberry	*Tumamoca macdougalii*		SR	S	S	Sonoran desertscrub and and Sinaloan thornscrub below 3,000 feet elevation.	Known populations are outside the study area.
Tusayan flame flower	*Talinum validulum*	SC	SR			Ponderosa pine forests in open meadows with shallow, rocky, clay soils from basalt at elevations from 5,600 to 7,700 feet.	Known populations are outside the study area.
Tusayan rabbitbrush	*Chrysothamnus molestus*	SC		S		Piñon-juniper grasslands where fires naturally occur at intervals of 15 to 30 years at elevations from 5,700 to 6,900 feet.	Known populations are outside the study area.
Utah solitaire lily	*Eremocrinum albomarginatum*		SR	S		Desert shrub communities in sandy soils or on sand dunes at elevations from 5,000 to 5,500 feet.	Known populations are from Apache and Navajo counties north of the study area.
Varied fishhook cactus	*Mammillaria viridiflora*		SR			Semidesert grasslands, interior chaparral, piñon-juniper and oak woodlands in crevices, among boulders, canyon sides and gravelly igneous substrates.	Cochise, Gila, and Graham counties.
Virlet paspalum	*Paspalum virletii*			S		Unknown.	Bear Valley or Sycamore Canyon in Santa Cruz County and Cochise County.

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Weeping muhly	*Muhlenbergia xerophila*			S		In seeps or with water in crevices of cliffs, bedrock, and canyon bottoms in oak, pine-oak and riparian woodlands at elevations from 3,520 to 6,000 feet.	Sycamore Canyon of the Pajarito Mountains in Santa Cruz County.
Welsh's milkweed	*Asclepias welshii*	T	HS			Open stabilized desertscrub dunes and the lee side of active dunes.	Known populations are outside the study area.
Welsh phacelia	*Phacelia welshii*	SC				Great Basin desertshrub communities along roadsides, gravelly washes in red shale of the Moenkopi Formation and on sandy volcanic ash at elevations from 4,250 to 5,100 feet.	Known populations are outside the study area.
Western fairy slipper	*Calypso bulbosa*		SR			Mixed conifer and subalpine forests with ponderosa pine, aspen, or spruce-fir along streams, in bogs, and the edges of meadows where soils with high organic matter are found at elevations from 8,000 to 10,000 feet.	White Mountains of Apache and Greenlee counties. Possibly in the Chuska Mountains in Apache County.
Whisk fern	*Psilotum nudum*		HS			Mesic woods, thickets, cienegas, and rocky slopes.	Santa Cruz County.
White-flowered cinquefoil	*Potentilla albiflora*			S		Open coniferous forest on rocky slopes at elevations from 7,500 to 9,500 feet.	Pinaleño Mountains in Graham County.
White mandarin twisted stalk	*Streptopus amplexifolius*		SR			Forests with springs at elevations from 10,000 to 11,000 feet.	White Mountains of Apache County near Mount Baldy.
White Mountains clover	*Trifolium neurophyllum*	SC		S		Permanently wet meadow, springs, and along streams at elevations from 6,500 to 9,000 feet.	In Arizona, known from the White Mountains of Apache, Graham, and Greenlee counties.
White Mountains paintbrush	*Castilleja mogollonica*	SC	SR	S		Grassy meadows and wetlands associated with permanent or intermittent creeks at elevations of 8,500 to 9,500 feet.	In Arizona, known from the White Mountains of Apache County in the vicinity of Mount Baldy.
Whiting indigo bush	*Psorothamnus thompsonae* var. *whitingii*	SC				Sandy clay banks and talus, gravelly or sandy washes at elevations from 3,800 to 5,000 feet.	Known populations are outside the study area.
Wiggin's milkweed vine	*Metastelma mexicanum*	SC		S		Oak woodland on open slopes on granitic soils at elevations from 3,500 to 5,500 feet.	Cochise and Santa Cruz counties.

Common Name	Scientific Name	Status				Habitat Considerations	Potential Occurrence in Project Study Area
		USFWS	STATE	USFS	BLM		
Wilcox fishhook cactus	*Mammillaria wrightii* var. *wilcoxii*		SR			Semidesert grasslands, Madrean pine-oak woodlands, steep, rocky slopes, canyons, and valleys, usually on alluvial or igneous substrates.	Cochise, Graham, and Santa Cruz counties.
Wislizenii gentian	*Gentianella wislizeni*	SC	SR	S		Open meadows and partially shaded slopes at elevations from 6,500 to 8,000 feet.	Chiricahua Mountains in Cochise County and the White Mountains in Greenlee County.
Wooly fleabane	*Laennecia eriophylla*			S		Grasslands and open oak woodlands on gravelly soils of ridges at elevations from 4,300 to 5,400 feet.	Cochise and Santa Cruz counties.
Woodland spurge	*Euphorbia macropus*	SC	SR			Pine-oak woodlands in shady canyon bottoms in leaf litter and open hillsides at elevations in Arizona from 2,100 to 7,500 feet.	The Huachuca Mountains of Cochise County, and the south end of Patagonia Mountains in Santa Cruz County. The largest known population is in Fort Huachuca.
Wright fishhook cactus	*Mammillaria wrightii* var. *wrightii*		SR			Semidesert grasslands, plains grasslands, piñon-juniper woodlands usually on alluvial or igneous substrates at elevations from 5,000 to 8,000 feet.	Quarino Wash in Apache County.
Yellow beavertail	*Opuntia basilaris* var. *aurea*		SR			Piñon-juniper woodlands	Limited information available. Known from Coconino County; unable to verify if it is found within the study area.
Yellow lady's slipper	*Cypripedium parviflorum* var. *pubescens*		HS			Mesic deciduous and coniferous forests in boggy and swampy areas, near rivers or canal banks, in wet meadows and damp woods at elevations from 6,000 to 9,560 feet.	Known in Arizona from Apache, Graham, and Greenlee counties.
Zuni fleabane	*Erigeron rhisomatus*	T	HS			Selenium-rich red or gray detrital clay soils derived from the Chinle and Baca formations from 7,300 to 8,000 feet elevation.	Known populations are outside study area.

SOURCES: Arizona Game and Fish Department 2008a, U.S. Fish and Wildlife Service 2008a, NatureServe 2008, U.S. Department of Agriculture 2008, Kearney and Peebles 1960, Arizona Rare Plant Committee 2001

C= Federal candidate species
CA= Federal Conservation Agreement
E= federally listed as endangered
HS= State of Arizona highly safeguarded plant species
PD= Federal candidate for delisting
S= Bureau of Land Management or U.S. Forest Service sensitive species
SC= Federal species of concern
SR= State of Arizona salvage restricted plant species
T= federally listed as threatened
WSC= State of Arizona wildlife of special concern
XN= experimental non-essential population

Special Status Species and Critical Habitats

A list of special status species along with habitat descriptions and species' potential to occur in the study area may be found in Table 2-9 above. A further discussion of those federally listed species with designated critical habitat may be found below.

Designated critical habitat for 12 federally listed species is found within the study area. This includes critical habitat for two bird species, nine fish species, and one mammal species. Acreages and stream miles of critical habitats are given below for each species.

Critical habitat for the federally threatened Mexican spotted-owl (*Strix occidentalis lucida*) is found in Apache, Cochise, Coconino, Gila, Graham, Greenlee, Navajo, and Santa Cruz counties within the study area. Critical habitat within the study area covers approximately 2,246,584 acres and is generally found in old-growth forests of mixed conifers or ponderosa pine with a near closed canopy (USFWS 2008a, 2008b).

Critical habitat for the federally endangered southwestern willow flycatcher (*Empidonax traillii extimus*) is found in approximately 20,316 acres of riparian areas with willows, cottonwoods, and saltcedar next to water in Apache, Cochise, Gila, Graham, and Greenlee counties within the study area (USFWS 2008b).

Several fish species have critical habitat within the study area, including the beautiful shiner (*Cyprinella Formosa*), Gila chub (*Gila intermedia*), Little Colorado spinedace (*Lepidomeda vittata*), loach minnow (*Poeciliopsis occidentalis occidentalis*), razorback sucker (*Xyrauchen texanus*), Sonora chub (*Gila ditaenia*), spikedace (*Meda fulgida*), Yaqui catfish (*Ictalurus pricei*), and Yaqui chub (*Gila purpurea*) (USFWS 2008a).

Critical habitat for three species—the beautiful shiner, Yaqui catfish, and Yaqui chub—is in the same location in Cochise County. This critical habitat covers approximately 8.4 acres and includes all aquatic habitats in the main portion of the San Bernadino National Wildlife Refuge (USFWS 2008b).

Critical habitat for the Gila chub is found in the study area in Cochise, Gila, Graham, Greenlee, and Santa Cruz counties on approximately 4,479 acres (USFWS 2008b). The Gila chub is generally found in the smaller headwater streams, cienegas, and springs or marshes of the Gila River Basin, although the species also may be found in larger streams.

The Little Colorado spinedace is a federally threatened species that inhabits moderate to small streams in Apache, Coconino, and Navajo counties. Critical habitat for the species is found along 18 miles of East Clear Creek, 8 miles of Chevelon Creek, and 5 miles of Nutrioso Creek covering approximately 161 acres (USFWS 2008a, 2008b).

The loach minnow is a federally threatened species found in creeks and rivers below 8,000 feet in elevation. Critical habitat for the species within the study area is found in Apache, Graham, and Greenlee counties on approximately 149 acres along various streams and rivers (USFWS 2008b).

The razorback sucker is a federally endangered species that inhabits backwaters and slower waters in riverine and lacustrine areas. Within the study area, critical habitat for the species includes the Gila River from the Arizona/New Mexico border to Coolidge Dam on the San Carlos Reservoir and the Salt River from US Highway 60/State Route 77 (SR 77) Bridge to Roosevelt Dam (USFWS 2008a). This covers approximately 13,750 acres within the study area (USFWS 2008b).

The federally threatened Sonora chub is found in small to moderately sized streams with cliffs and boulders at elevations below 3,900 feet in Santa Cruz County. Critical habitat for the species is located in Sycamore Creek from Yank Spring to the state's border with Mexico, 1.25 miles of Penasco Creek, and an unnamed stream approximately 1.5 miles downstream of Yank Spring covering approximately 44.1 acres (USFWS 2008a, 2008b).

The federally threatened spikedace is found below 6,000 feet in elevation in moderate to large perennial streams in Apache, Cochise, Coconino, Gila, Graham, Greenlee, Navajo, and Santa Cruz counties within the study area (USFWS 2008a). Critical habitat for the species is located along portions of the Gila River, Lower San Pedro River, Aravaipa Creek, and Eagle Creek on approximately 6.6 acres (USFWS 2008b).

The Mount Graham red squirrel is a federally endangered species found in the Pinaleño Mountains of Graham County. Approximately 1,921 acres of critical habitat for the species is found in the Pinaleño Mountains (USFWS 2008b).

Wildlife Linkages

Wildlife linkage zones have been identified within Arizona in areas that are important to maintaining wildlife habitat connectivity and biodiversity in the state. Arizona's wildlife linkages assessment project was a multidisciplinary effort directed by ADOT to identify and document areas that are important to maintaining the integrity and connectivity of wildlife populations, essential habitats, and natural ecosystems. As part of the initial results of this investigation, potential linkage zones (PLZ) and potential linkage zones across habitat blocks were identified as areas essential to meeting the objectives described above. Potential linkage zones typically are located outside of public land where human development or agriculture threaten to further fragment, degrade, or destroy the fundamental qualities essential to the ecological balance in natural areas surrounding these PLZs. The PLZs in the study area are described in Table 2-10 and summarized in the text that follows. Thirty-six linkage zones occur within the study area that are found predominantly in the Arizona/New Mexico mountains, Apache Highlands, and Sky Island ecoregions (Table 2-10). Three linkage zones also partially occur in either the Colorado Plateau or Sonoran Desert ecoregions (Bailey 1995).

Linkage zones in the study area represent a diverse array of biotic communities. Those of the Sky Island ecoregion in the southern part of the study area most commonly occur in semidesert grasslands. The linkage zones of the Apache Highlands occur in a variety of biotic communities that include interior chaparral, Chihuahuan desertscrub, semidesert grasslands, woodlands, and conifer forests. Linkage zones in the Arizona/New Mexico mountains ecoregion predominantly occur in woodlands and conifer forests.

The main threats to the integrity of biotic communities in these areas are from human activities. One of the main threats, roads and highway systems, divide contiguous habitats, block dispersal corridors, and increase mortality from collisions with vehicles. Two other main threats in the region include agriculture and urban development, which serve to degrade and destroy native habitats.

Table 2-10 – Potential Linkage Zones (PLZ) Occurring in Eastern Arizona Regional Framework Study

Name	PLZ Number	Area (sq mi)	Ecoregion(s)	Predominant Biotic Community
Mogollon Rim - Navajo Nation	27	5854.226	AZ/NM Mountains, Colorado Plateau	Plains and great basin grassland
SR 260 West from I-17 to SR 87	39	102.014	Apache Highlands, AZ/NM Mountains	*Mixed:* Semidesert grassland Great Basin conifer woodland Petran Montane conifer forest Interior chaparral
East - West Mogollon Plateau	40	43.216	AZ/NM Mountains	Petran montane conifer forest
SR 260 Payson - Heber	41	90.892	Apache Highlands, AZ/NM Mountains	Petran montane conifer forest
Aripine - Cibecue	42	19.773	AZ/NM Mountains	Great Basin conifer woodland
North - South Mazatzal Mountains	53	36.497	Apache Highlands	Interior chaparral
Sierra Ancha - Superstition Mountains	54	54.477	Apache Highlands, Sonoran Desert	AZ upland sonoran desertscrub
East - West Sierra Ancha SR 288	55	108.777	Apache Highlands, Sonoran Desert, AZ/NM Mountains	*Mixed:* Semidesert grassland Great Basin conifer woodland Petran montane conifer forest Interior chaparral
Sevenmile - Sevenmile East US 60	56	134.425	Apache Highlands	Great Basin conifer woodland Interior chaparral
Faught Ridge - Baldy SR 73	57	24.711	AZ/NM Mountains, Apache Highlands	Petran montane conifer forest
State Route 260 East	58	46.750	AZ/NM Mountains, Apache Highlands	Petran montane conifer forest
Correjo Crossing - Clifton US 191	59	264.746	AZ/NM Mountains, Apache Highlands, Sky Island	*Mixed:* Petran montane conifer forest Semidesert grassland
Black Hills - Tollgate Canyon	60	15.741	Sky Island	Semidesert grassland
Black Hills - Peloncillo Mountains	61	19.299	Sky Island	Semidesert grassland
State Route 75	62	116.038	Apache Highlands	Chihuahuan desertscrub Semidesert grassland
Santa Catalina - Galliuro	82	448.835	Sky Island	AZ upland sonoran desertscrub Semidesert grassland
Galliuro - Pinaleno	83	584.997	Sky Island	Semidesert grassland
Pinaleno - San Simon Valley	84	91.940	Sky Island	Semidesert grassland
Galliuro - Winchester - Dragoon	88	245.473	Sky Island	Semidesert grassland

Name	PLZ Number	Area (sq mi)	Ecoregion(s)	Predominant Biotic Community
Wilcox Playa - Winchester - Pinaleno - Dos Cabezas	89	294.842	Sky Island	Semidesert grassland
Pinaleno - Dos Cabezas - San Simon Valley	90	456.740	Sky Island	Chihuahuan desertscrub Semidesert grassland
Tumacacori - Santa Rita	93	155.826	Sky Island	Semidesert grassland
Rincons - Whetstone - Santa Rita	94	262.768	Sky Island	Semidesert grassland
Santa Rita - Empire Complex	95	32.619	Sky Island	Madrean evergreen woodland Semidesert grassland
Patagonia - Santa Rita	96	31.623	Sky Island	Semidesert grassland
Whetstone - San Pedro River	97	46.449	Sky Island	Semidesert grassland
Las Cienegas - Huachuca	98	84.637	Sky Island	Plains and Great Basin grassland Semidesert grassland
Dragoon - San Pedro River	99	96.368	Sky Island	Chihuahuan desertscrub Semidesert grassland
Fort Huachuca - San Pedro River	100	17.301	Sky Island	Semidesert grassland
Chiricahua - Peloncillo	101	466.653	Sky Island	Semidesert grassland
Tumacacori - Mexico	104	80.462	Sky Island	Madrean evergreen woodland Semidesert grassland
Santa Cruz - Mexico	105	6.333	Sky Island	Madrean evergreen soodland Semidesert grassland
Patagonia/Huachuca - Mexico	106	76.425	Sky Island	*Mixed:* Madrean evergreen woodland, Plains and Great Basin grasslands Semidesert grassland
San Pedro River - Mexico	107	5.085	Sky Island	Semidesert grassland
San Bernadino - Mexico	108	42.633	Sky Island	Chihuahuan desertscrub
Peloncillo – Mexico	109	20.360	Sky Island	*Mixed:* Madrean evergreen woodland semidesert grassland Chihuahuan desertscrub

SOURCES: Arizona Department of Transportation 2008a, 2008b; Bailey 1995
NOTES: AZ/NM = Arizona/New Mexico, I-17 = Interstate 17, PLZ = Potential Linkage Zone, SR = State Route

Conservation Areas

The major public lands include Arizona State Trust land, BLM, and USFS land provide general protections to sensitive and threatened and endangered species. These lands compose the greatest landholdings in the study area. Private land and land of the Navajo, White Mountain Apache, and San Carlos Apache Indian reservations include other major landholdings.

Wilderness areas and special designation areas of the USFS and BLM provide the largest contiguous conservation areas that do or can protect plant and wildlife populations and

wildlife habitat. The Nature Conservancy (TNC) preserves, USFWS national wildlife refuges, and state wildlife areas typically represent small areas in the study area that protect particularly rare or imperiled habitats.

The Wilderness Act of 1964 established the National Wilderness Preservation System, the system of all America's wilderness areas, to "secure for the American people of present and future generations the benefits of an enduring resource of wilderness" (Wilderness.net 2008).

Within the study area there are seven BLM-administered wilderness areas and one wilderness study area covering a total of 86,752 acres. Additionally, BLM administers two Riparian National Conservation Areas (RNCA) covering 80,000 acres and part of a third National Conservation Area within the study area. The San Pedro RNCA (57,000 acres) was designated with the primary purpose "to protect and enhance the desert riparian ecosystem, a rare remnant of what was once an extensive network of similar riparian systems throughout the American Southwest" (BLM 2008b). The Gila Box RNCA (23,000 acres) has four perennial waters, the Gila and San Francisco rivers and Bonita and Eagle creeks (TNC 2008c). The Las Cienegas National Conservation Area is partially located within the study area and contains grasslands, oak hills, and riparian areas that connect some of the area's Sky Island mountain ranges (TNC 2008d). A list of wilderness and RNCA areas found within the study area and accompanying acreages is found in Table 2-11.

BLM administers 18 areas of critical environmental concern (ACECs) within the study area. ACECs are each given special management prescriptions in order to protect resources including plant and wildlife species and habitats. The ACECs within the study area cover approximately 42,834 acres (Arizona Land and Resource Information System 1999).

The USFS manages 14 wilderness areas and one primitive area within the study area covering a total of 802,271 acres (acreage excludes areas that are only partially within the study area) (see Table 2-11). These wilderness areas cover a large variety of biotic communities and habitat types throughout the study area.

The USFWS manages two national wildlife refuges covering 5,079 acres in the study area. The San Bernadino National Wildlife Refuge in Cochise County covers 2,309 acres and was purchased by USFWS to protect water resources and habitat for endangered native fish. The Leslie Canyon National Wildlife Refuge in Cochise County covers 2,770 acres and was acquired to protect habitat for the endangered Yaqui chub and Yaqui topminnow (USFWS 2008c).

The National Park Service administers 10,290 acres of wilderness within the Chiricahua National Monument (see Table 2-11). The Chiricahua National Monument is in Cochise County in the Sky Islands area and encompasses a number of different habitat types including grasslands, desert scrub, riparian, and pine woodlands (National Park Service 2008).

The State of Arizona manages 10 wildlife areas covering approximately 7,862 acres within the study area. These wildlife areas range from grasslands to lakes, streams, and wetlands. Wildlife areas have individual management objectives, but in general are managed to provide habitat for wildlife as well as to provide recreational opportunities including camping, fishing, hiking and hunting (Arizona Game and Fish Department 2008b).

TNC manages three preserves and one cooperative management area within the study area. Acreages were only available for two of the preserves; they have a combined area of

56,120 acres. The Aravaipa Canyon Preserve covers 7,000 acres and is managed to ensure "the long-term protection of the stream system and its mixed broadleaf riparian forest composed of cottonwood, willow, walnut, alder, and sycamore trees." The Muleshoe Ranch Cooperative Management Area covers 49,120 acres and is managed to "conserve and enhance the unique ecosystems found here and to protect endangered species, as well as the areas they depend upon." The Patagonia-Sonoita Creek Preserve (acreage not available) contains areas of rich riparian vegetation, including Fremont cottonwood (*Populus fremontii*)/Goodding willow (*Salix gooddingii*) gallery forests, and supports high levels of biodiversity. The Ramsey Canyon Preserve (acreage not available) is known for the diversity of its plant and animal life, which includes up to 14 species of hummingbirds (TNC 2008).

Table 2-11 – Wilderness and Conservation Areas within the Study Area

Wilderness or Conservation Area Name	Acres
BLM Managed Areas	
Aravaipa Canyon Wilderness	19,410
Baker Canyon Wilderness Study Area	4,812
Dos Cabezas Wilderness	11,700
Fishhooks Wilderness	10,500
Needles Eye Wilderness	8,760
North Santa Teresa Wilderness	5,800
Peloncillo Wilderness	19,440
Redfield Canyon Wilderness	6,600
Gila Box Riparian National Conservation Area	23,000
Las Cienegas National Conservation Area (partially in study area)	45,000*
San Pedro Riparian National Conservation Area	57,000
BLM Areas of Critical Environmental Concern	
111 Ranch Research Natural Area	2,667
Appleton-Whittell (Portion 1)	2,896
Appleton-Whittell (Portion 2)	339
Bear Springs Badlands	3,226
Bowie Mountain Scenic Area (Portion 1)	3,705
Bowie Mountain Scenic Area (Portion 2)	572
Desert Grasslands Research Natural Area – Mescal Ridge	387
Desert Grasslands Research Natural Area – Pilares	101
Dos Cabezas Peaks	26
Eagle Creek Bat Cave	41
Guadalupe Canyon Outstanding Natural Area	2,929
Hot Springs Watershed	17,794
Saint David Cienega Research Natural Area	386
San Pedro River Research Natural Area	1,419
San Rafael Research Natural Area	379
Turkey Creek (Portion 1)	2,261
Turkey Creek (Portion 2)	43
Willcox Playa National Natural Landmark	3,665
USFS Managed Areas	
Bear Wallow Wilderness	11,080
Blue Range Primitive Area	173,762
Chiricahua Wilderness	87,700
Escudilla Wilderness	5,200

Wilderness or Conservation Area Name	Acres
Fossil Springs Wilderness (partially within study area)	22,149*
Four Peaks Wilderness (partially within study area)	61,074*
Galiuro Wilderness	76,317
Hellsgate Wilderness	37,440
Mazatzal Wilderness	252,390
Miller Peak Wilderness	20,228
Mount Baldy Wilderness	7,079
Mount Wrightson Wilderness	25,260
Pajarita Wilderness	7,553
Salome Wilderness	18,531
Salt River Canyon Wilderness	32,101
Santa Teresa Wilderness	26,780
Sierra Ancha Wilderness	20,850
West Clear Creek Wilderness (partially in study area)	15,238*
Wet Beaver Wilderness (partially in study area)	6,155*
USFWS Managed Areas	
San Bernadino National Wildlife Refuge	2,309
Leslie Canyon National Wildlife Refuge	2,770
NPS Managed Areas	
Chiricahua National Monument	10,290
State of Arizona Managed Areas	
Becker Lake-Enders Wildlife Area	679
Bog Hole Wildlife Area	Unknown
Cluff Ranch Wildlife Area	748
Luna Lake Wildlife Area	111
May Memorial Wildlife Area	560
Sipe White Mountain Wildlife Area	1,362
Wenima Wildlife Area	357
White Mountain Grasslands Wildlife Area	2,850
Whitewater Draw Wildlife Area	600
Willcox Playa	595
The Nature Conservancy Managed Areas	
Aravaipa Canyon Preserve	7,000
Muleshoe Ranch Cooperative Management Area	49,120
Patagonia-Sonoita Creek Preserve	Unknown
Ramsey Canyon Preserve	Unknown

SOURCES: Bureau of Land Management 2008, Wilderness.net 2008, The Nature Conservancy 2008, Arizona Game and Fish Department 2008b, U.S. Fish and Wildlife Service 2008c, National Park Service 2008
NOTES: * excluded from total acreage calculations.